

American Artisan

Founded 1888

The Warm Air Heating and Sheet Metal Journal

Vol. 97, No. 26

CHICAGO, JUNE 29, 1929

\$2.00 Per Year

HOMES with Zinc Roofs are quite commonplace in Europe, where they have been popular for a great many years... And the soundness of the practice appeals to the American house-owner when he hears of Zinc's permanence and low cost—with no periodical upkeep.

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THE twelve undisputed superior points of Midland warm air steel furnace construction as set forth in this Midland TRUESTEEL series of advertisements, to date have secured more advocates of modern business practice and new dealers than any series of warm air furnace advertisements ever published and the adoption of Midland modern merchandising methods, by these numerous and reliable dealers, has caused them to secure many orders, at a time when orders were HARD to get.

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New Merchandising
Plan is About
Ready!

JOIN US--BUSINESS IS EXCELLENT
MIDLAND PRODUCTS ARE SUPERIOR

THE MIDLAND FURNACE CO.
COLUMBUS, OHIO



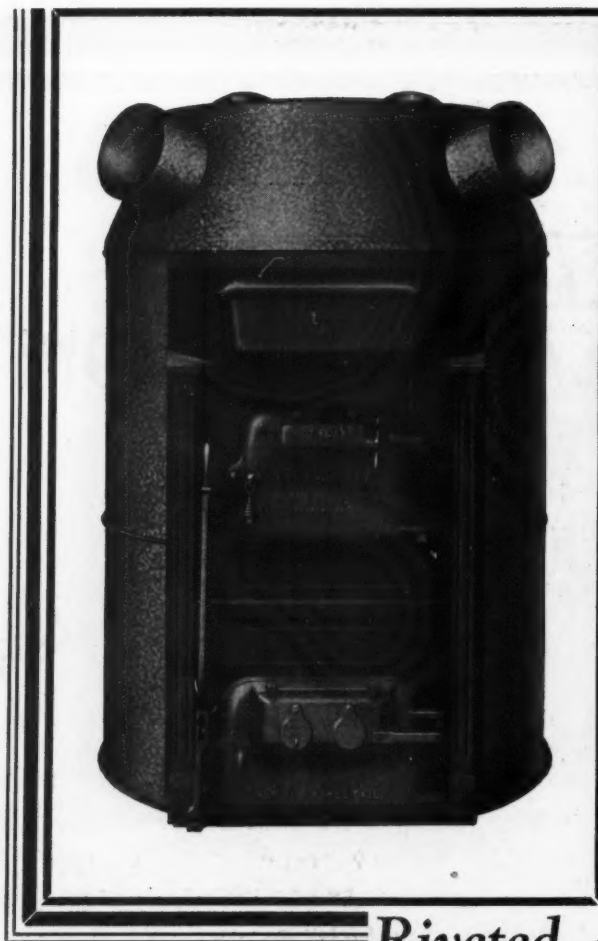
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Furnaces
Coming Soon!

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ALL STEEL ♦♦♦



CLEANER HEAT



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*Riveted and welded—both
Equipped with Duplex Grates*

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For literature, prices and advance information, return the coupon.



THE FOX FURNACE COMPANY

Largest Makers of Heating Equipment in the World.

ELYRIA, OHIO

SUNBEAM

WARM-AIR FURNACES

TRADE MARK

**A FURNACE FOR EVERY
REQUIREMENT—QUALITY
AND PRICE, BOTH**

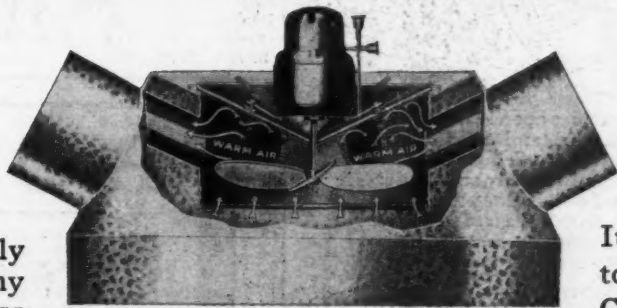
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Please send me, as soon as available, literature, prices and complete information about the new STEEL furnaces. Also send a copy of the 40-page Sunbeam Heating Manual.

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City and State A-7

Say you saw it in AMERICAN ARTISAN—Thank you!

---this way you render an exclusive service and receive an unusual and easily made profit



THERE is only one reason why you are in business and that is to make a profit.

There is, however, as we all have learned, only one way to make a profit and that is by rendering a service for which folks will pay.

Naturally, being an alert warm air heating contractor you are always on the lookout for those commodities which enable you to render *more* and *better* service to the people in your community so you can make *more* and *better* profits.

If you have passed by the opportunity of giving your customers better warm air heating by selling them a service which enables them to have quicker heating and **EXTRA heat IN THE VERY ROOMS WHICH NEED IT** you have naturally passed up some fine profits as *this* is a service every owner of a warm air heating system wants.

ROBINSON Heat Distributor

"Sitting on top of the heating World"



It can be hooked up to Thermostatic Control—operating with coal, gas or oil fired warm air furnaces—it is *quiet*,

smooth running and high grade in every respect. It is easily installed, and its exclusive feature of *direct distribution of warm air to rooms desired* makes sales easy.

Thousands of homes are better heated with the ROBINSON Heat Distributor—hundreds of dealers like yourself are making good extra profits—it is the *largest selling furnace fan* on the market **BECAUSE** it is rendering an *exclusive* service.

Look at the large list of *Jobbers*—Write to the one you do business with for full details and prices.

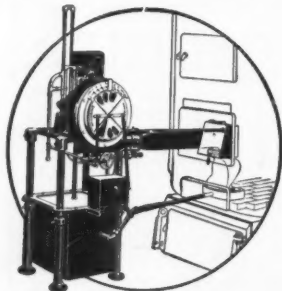
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Warm Air Furnaces are designed to operate with a continuous coal fire—they will not stand the alternate heating and cooling of intermittent firing. With the McIlvaine the flame burns continuously and moderately. It is not turned on and off. It does not crack the furnace fire pot or open up the joints. It does not force odors out into the circulating system. "The McIlvaine is ideal also for hot water and steam plants."

Write today for complete information concerning the McIlvaine Sales Franchise.

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McILVAINE

OIL BURNER

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Roof Cement — Stove Putty
Plumbers Putty

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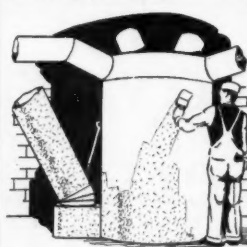
Established
1902



KNOW how good furnace pipe can be—write for details and prices today.

CHICAGO FURNACE SUPPLY CO.
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BRAND new numbers in attractive fadeless colors in furnace covering, coating, and insulation. **JUST WHAT YOU NEED** to increase your sales. Each attractive installation sells another. Spreads with a brush. Easy to apply—no cutting and fitting—no paste. **TAKES THE PLACE OF ASBESTOS PAPER** on old or new furnaces. Apply over tin, galvanized iron, or paper covered surfaces. **MAKE THE INSTALLATION 100% SEAMLESS** with **LIQUID ASBESTOS**, the tailor-made suit for every furnace.

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HELPS INCREASE SALES. A trial order is convincing. There are many reasons why every furnace dealer should know about **LIQUID ASBESTOS.** It's far superior to any other covering.

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Dealers who are using **LIQUID ASBESTOS** are getting surprising results. Ask for our **SPECIAL DEALERS' PRICES TODAY.**
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FOR STOVES AND HEATERS FIRST-CLASS IN WOOD and IRON
VEDDER PATTERN WORKS ESTABLISHED 1835 **TROY, N. Y.**

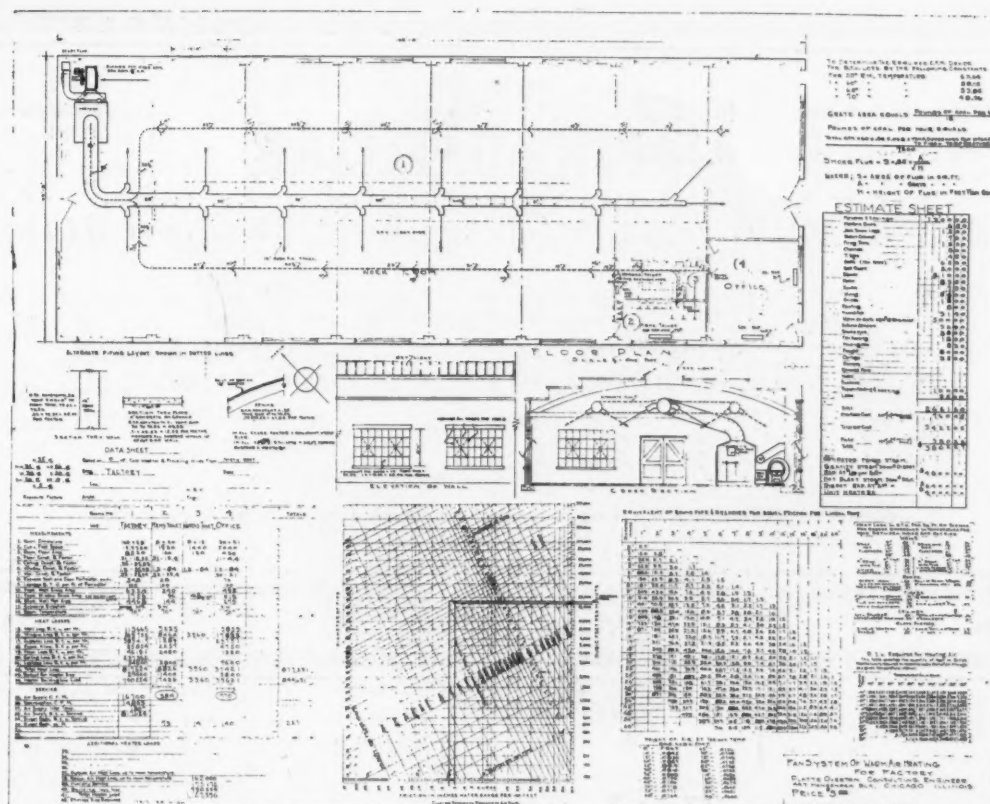
IF there is a tool or machine that you need and you don't know where to get it—

Write to the

Notes and Queries Dept.

of

AMERICAN ARTISAN



NOW with this help you can handle the BIG heating contracts

IF you are a live progressive warm air heating and sheet metal contractor and if you have been passing up the Big Fan Blast Warm Air Heating jobs because you lacked the proper *engineering* information to tackle this type of job, *this service* is just what you have been waiting for.

This service, which consists of complete plans and engineering information, won't make you an engineer, but if you know how to read plans, charts, graphs, and tables and know how to figure grate areas, heat losses, pipe sizes, etc., *when you are shown how with complete data and correct formula*, you will realize the great value of this information and be able to use it profitably.

The plan illustrated above (greatly reduced in size) is that of a Fan Blast Warm Air Heating installation in a *factory*. All the information necessary for you to figure a similar installation for a larger or smaller factory is given right on the full size plan.

Plans, specifications, material and cost estimates, instruction sheets, description of system design, etc., showing installations in *Church, School, Theatre, Garage and Residence* are also available. Each plan is complete with charts, graphs, tables and heat loss data sheet. Methods for sizing ducts, mains and branches are given together with data for determining grate area, smoke flue area, fan and motor requirements.

ENGINEERING PLANS for FAN BLAST Warm Air Heating and Ventilating

THESE plans and accompanying data were prepared by a well known Fan Blast Warm Air Heating and Ventilating Engineer. Live contractors who can apply this information can use it to land the big jobs that come up in their community. The Schools, Churches, Factories, etc., in your town should be heated by *Warm Air* and these plans open the way for you to get the business.

Send the coupon for further information.

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PLANS for FAN BLAST
WARM AIR HEATING AND
VENTILATING.

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Town..... State.....

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1-

**COLD AIR
SHOE**

It meets all the requirements of the ordinary cold air shoe. The pans are so spaced that full unobstructed air passage is provided.

2-

AIR CLEANER

The water pans placed staggered forces all the air to brush over the water which catches the dust and lint.

Each pan has an overflow which drains all surface water to pans below on down to the large pan at the bottom which also has overflow.

3-

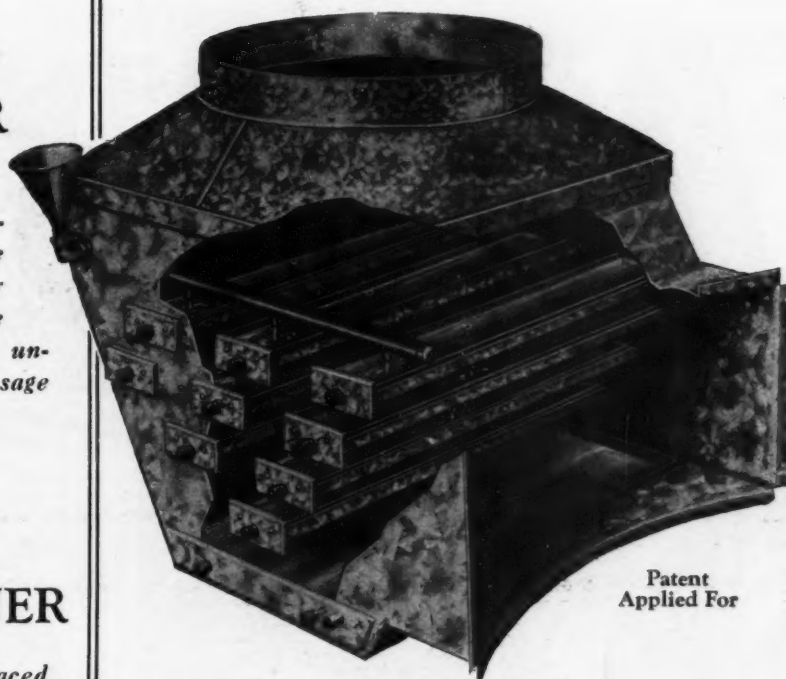
HUMIDIFIER

Unlike all other humidifiers this one is in the COLD AIR.

Humidification is by absorption — not evaporation.

The air passing over the water absorbs the needed moisture.

The pans slide out easily for cleaning or inspection and are easily filled.



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Something New For Better Warm Air Heating

EVERY job needs a cold air shoe—now with this new combination Cold Air Shoe, Air Cleaner and Humidifier you give your customers proper humidification and an air cleaner at a surprisingly low cost.

No more work for you to install but a much better profit because your prospective customers can see this practical idea readily.

This new Handy invention will help you sell more and better warm air heating installations.

Write for prices and full descriptive matter today.

F. MEYER & BRO. COMPANY
PEORIA, ILLINOIS

HANDY FURNACE PIPE, REGISTERS, FITTINGS
All Warm Air Heating Supplies



We invite your inspection and solicit your inquiry.

Say you saw it in AMERICAN ARTISAN—Thank you!



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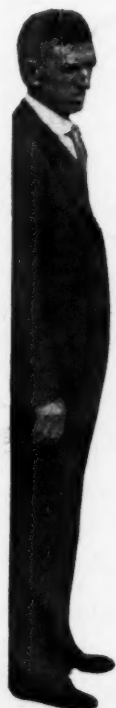
The Warm Air Heating and Sheet Metal Journal



Vol. 97

CHICAGO, JUNE 29, 1929

No. 26



J. E. Merrick

INTRODUCING The OFFICIAL National Sheet Metal Association Family



W. C. Markle

HERE they are, the principals in the official family of the National Association of Sheet Metal Contractors! These men were elected to guide the destinies of the association during the year 1929-1930.

Let it be said that in formulating the ticket of nomination, the nominating committee certainly employed excellent judgment. J. E. Merrick, Louisville, Kentucky, is a 100 per cent association man. He has worked untiringly for the good of not only the association itself, but of the entire sheet metal industry for many years. As president he will give a good account of himself.

George I. Ray, Charlotte, North Carolina, is unquestionably deserving of the honor which was conferred upon him in giving him the First Vice Presidency. Although a comparatively young man, and consequently very busy with his own affairs, Mr. Ray has never stinted

Joseph C. Gardner, Left,
and George I. Ray

upon the amount of time he has given the association. He has been at the beck and call of the committee chairmen and officers alike, and in him Mr. Merrick has a willing and industrious teammate.

W. C. Markle, Pittsburgh, Secretary, was, previous to becoming secretary of the association, President for two terms. There perhaps is, with possibly one or two exceptions, no man in the sheet metal industry who has a more intimate knowledge of the association's affairs than Mr. Markle. This will be his third term as secretary and

job. In Mr. Markle the association as such he is doing a mighty fine thing has indeed a most capable secretary.

Joseph C. Gardner, Indianapolis, Treasurer, has a long record of association work to his credit. He is perhaps a member of more boards of directors of associations, local, state and national, than any other man in the industry. He has served the National Association of Sheet Metal Contractors faithfully for many years and has already had the honor of the Presidency of that organization conferred upon him. As Treasurer Mr. Gardner will be a good watch dog over the association's finances. Mr. Gardner succeeds Jules Gerock as treasurer. Mr. Gerock wished to retire. In executive ability, experience and good fellowship the official family of the National Association of Sheet Metal Contractors is indeed well favored.

THE data presented in this paper were obtained in connection with an investigation which is being conducted by the Engineering Experiment Station of the University of Illinois, of which M. S. Ketchum, Dean of the College of Engineering, is Director, in co-operation with the National Warm Air Heating Association, under the supervision of A. C. Willard, Professor of Heating and Ventilation and Head of the Department of Mechanical Engineering. The basic data from which this paper is prepared are given in Engineering Experiment Station Bulletin No. 189 of the University of Illinois.³

Under the terms of a co-operative agreement between the National Warm Air Heating Association and the University of Illinois, a very extensive study of furnace heating problems has been made, using first an experimental plant

¹Research Professor, Engineering Experiment Station, University of Illinois, Urbana, Ill.

²Special Research Assistant, Engineering Experiment Station, University of Illinois.

³"Investigation of Warm-Air Furnaces and Heating Systems, Part IV, Research Residence," by A. C. Willard, A. P. Kratz and V. S. Day, Engineering Experiment Station Bulletin No. 189.

Presented at the semi-annual meeting of the American Society of Heating and Ventilating Engineers, Bigwin Inn, Lake-of-Bays, Ontario, Canada, June, 1929.



Fig. 1. Warm Air Heating Research Residence

ANALYSIS of the Over-All Efficiency of a Warm Air Heated Residence

By A. P. Kratz¹ and J. F. Quereau²

with auxiliary equipment in the laboratory, and later a typical modern residence erected by the association for the express purpose of correlating and extending the work in the laboratory to the conditions of actual installation. It was in this residence that the data herein presented were obtained by research over a period of several years' duration.

Introduction

The design of house heating plants has usually been based on the assumption that the only heat available for compensating for the heat loss from the house would be that actually delivered to the rooms by the heating plant. Thus a boiler or furnace operating at 60 per cent efficiency would be expected to util-

ize 60 per cent of the heat of the fuel burned and to deliver this heat at the boiler nozzle or furnace bonnet. The loss between the heating unit and the rooms would then be deducted and only the remainder, usually less than 50 per cent of the heat of the fuel, would be regarded as available for actually heating the rooms.

Data obtained in the warm air heating research residence have indicated that in a self contained heating system much of the assumed waste heat

is available for heating the house and is utilized quite efficiently. With efficient combustion, most of the 50 to 60 per cent usually assumed as loss, is used for heating the house and results in a very high over-all house efficiency. It is with this over-all house efficiency that this paper is concerned.

In all respects, the research residence, Fig. 1, is of standard frame dwelling construction with the single exception of the studding, which is 2 by 6 inches instead of the usual 2 by 4 inches. This permits the use of larger wall stacks or vertical heat pipes than could be used in 2 by 4-inch construction. The wall section is as follows: Weather boarding, building paper, ship-lap siding on 2 by 6-inch stud-

ding, lath, and plaster with rough sand finish. The coefficient of heat transmission for this wall section is 0.20 B.t.u. per square foot per hour per degree Fahrenheit, at a wind velocity of 15 miles per hour. The walls are not insulated, and no weather stripping is used at the

rooms, received heat solely from the heating system.

The room arrangement and exposures are shown in Figures 2, 3 and 4. It should be noted that only one room, the bathroom, has a single exposure to the weather, and that throughout the residence the

season since December, 1924. The heater was of a common cast-iron type and had a grate area of 2.88 square feet. The smoke pipe, 10 inches in diameter and 10 feet in length, was connected to a 12 by 12-inch fireclay-lined flue, which was 35 feet high. This chimney had 8-inch brick walls and passed up through the house. A cross damper in the smoke pipe, 3 feet from the furnace, was used to restrict the draft. The check draft was sealed.

The location of the warm-air registers are shown in Figures 2, 3 and 4, and details of the piping and registers are given in Table 1. A single cold air return was in use when the data herein presented were obtained. The cold air was returned through a 36 by 36-inch square wood grille and 33-inch round duct, from a position in the hall near the main entrance to the residence. The free area of the grille was 800 square inches and the duct area 854 square inches.

The heat pipes and fittings, eleven in number, were of standard commercial sizes and types, no effort being made to obtain streamline flow by the use of special fittings. All pipes were of bare bright tin, except for narrow sealing strips of asbestos paper at the joints, previous tests having demonstrated that asbestos paper covering on bright tin pipes is wasteful of heat.⁴ The wall stacks were of mixed construction, some being of double tin with

⁴Emissivity of Heat from Various Surfaces, by V. S. Day, University of Illinois Experiment Station Bulletin No. 117.

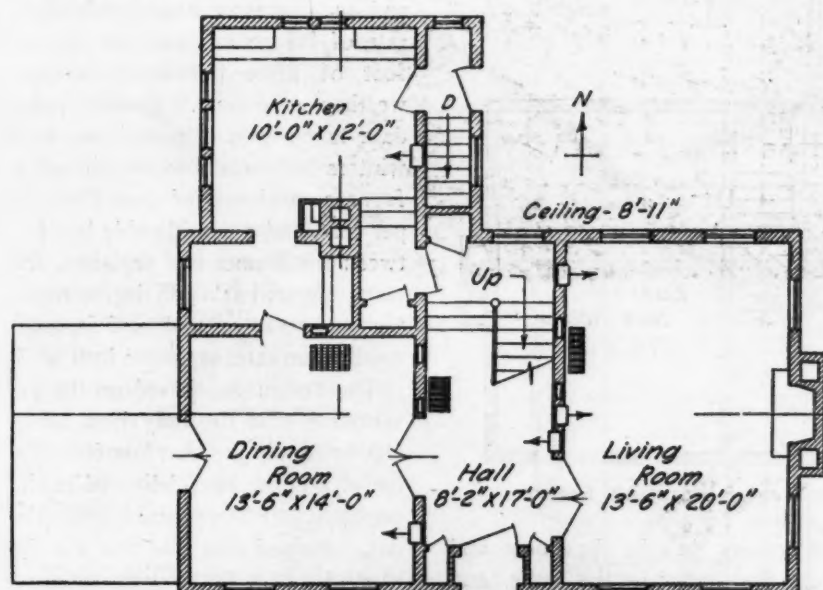


Figure 2. First Floor Plan with Location of Warm Air Registers and Cold Air Return Grilles (For Third Installation)

windows and doors. Interlocking copper shingles are used on the roof. The research residence has not been occupied by a family. Instead, a caretaker has lived in the residence, and the daily occupants have been the members of the research staff. Furniture, rugs and window shades and curtains were provided. No cooking or other domestic activities requiring the application of heat were carried on. Thus the kitchen, as well as all other

proportion of glass area is high. Hence the heating problem was typical of residence heating. The heat losses calculated by the standard methods are approximately 119,000 B.t.u. per hour at 0 degree Fahrenheit and 15 miles per hour wind velocity.

Heating Plant

A gravity circulating warm-air heating plant was installed and has been in operation in the residence continuously during each heating

Table I. Leader Pipe, Stack, and Register Sizes Used in Warm Air Research Residence

Story	Room	Leader		Stacks (or throats)			Registers		
		Diameter in.	Area sq. in.	Size in.	Type	Area sq. in.	Size in.	Free area sq. in.	Free area % of total
First	Living room, N.....	10	78.5	5½x13	Double	71.5	10x12	83.5	70
	Living room, S.....	10	78.5	5½x13	Double	71.5	10x12	83.5	70
	Hall	12	113.0	7 9/16x14	Single	106.0	12x14	120.5	72
	Dining room	10	78.5	5½x13	Double	71.5	10x12	83.5	70
	Kitchen	12	113.0	7 x14	Single	98.0	12x14	120.5	72
Second	E. bedroom	10	78.5	5 x12	Single	60.0	10x12	83.5	70
	S. W. bedroom.....	9	64.0	3½x12	Single	42.0	9x12	74.0	69
	Bathroom	8	50.0	3 x10	Double	30.0	8x10	53.0	67
	N. W. bedroom.....	10	78.5	5½x13	Double	71.5	10x12	83.5	70
Third	E. dormitory	8	50.0	3 x10	Single	30.0	8x10	53.0	67
	W. dormitory	8	50.0	3 x10	Double	30.0	8x10	53.0	67
		Totals							
First			461.5			417.5			
Second			271.0			203.5			
Third			100.0			60.0			
Total			832.5			681.0			

intervening air space, and others of single tin construction. The cross-sectional area of the stacks averaged 70 per cent of the area of the base-

delivered at the registers. This is shown by the curves of Fig. 6. This loss of heat between the bonnet and registers consists of heat loss from

cent finally was delivered at the registers. For soft coal, the corresponding values were 41 per cent available at the bonnet and 31 per cent delivered at the registers.

In designing the heating system for the residence, a register air temperature of 175 degrees Fahrenheit and a corresponding combustion rate of 7.5 pounds coal per square foot of grate per hour in zero weather were used. However, the data taken over a period of two winters indicates that in spite of a furnace efficiency of less than 60 per cent, and a considerable loss between the bonnet and registers, the plant operated at a 135 degree register temperature and a 3.5-pound combustion rate, as shown by Fig. 7.

The design was based on the assumption that the only heat available to supply the heat loss from the house was the heat delivered at the registers. It is apparent from the data obtained that this was not the case, for the house was satisfactorily heated at much lower register air temperatures and combustion rates than those assumed. The difference between the heat appearing

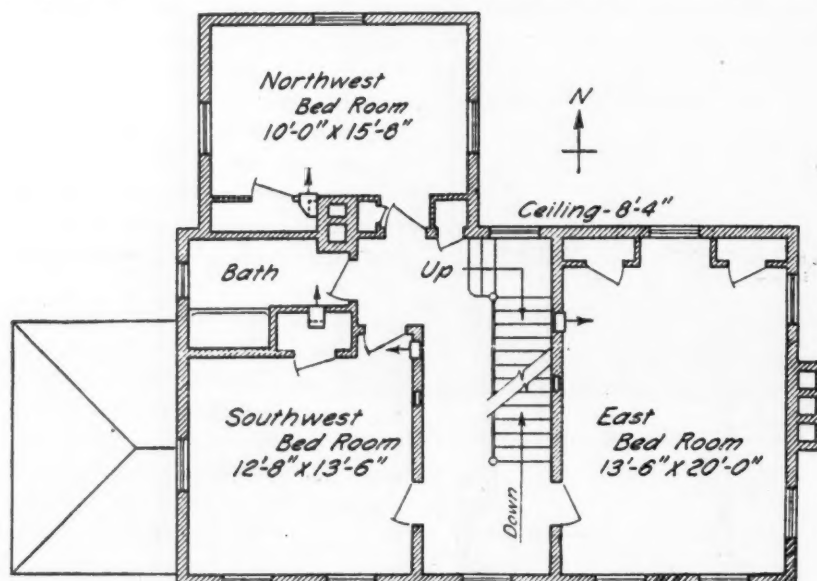


Figure 3. Second Floor Plan With Location of Warm Air Registers

ment heat pipes to which they were connected. Registers were of commercial types and sizes and, in this particular installation, were all of the wall types.

It has been the object in this description of the research residence and the heating plant to show that both were standard rather than special, and that, therefore, the data which follow are such as might be obtained in any well designed warm-air heating plant.

Furnace Performance with Hard and Soft Coal

The performance of the plant with anthracite coal, low-temperature and by-product coke, and bituminous coal is shown by the curves in Fig. 5.

With anthracite coal, the maximum efficiency of the furnace proper was 58.5 per cent, and the corresponding combustion rate was approximately 2.5 pounds coal burned per square foot of grate per hour. With soft coal, the maximum efficiency was only 41 per cent and occurred at a combustion rate of over 4 pounds.

Of the heat in the air at the furnace bonnet (which at a maximum was 58.5 per cent of the heat of the fuel burned) only 75 per cent was

the leaders in the basement and from the stacks in the walls, and takes place by both radiation and convection. It has the effect of reducing the efficiency of the system as a whole, as shown in the lower

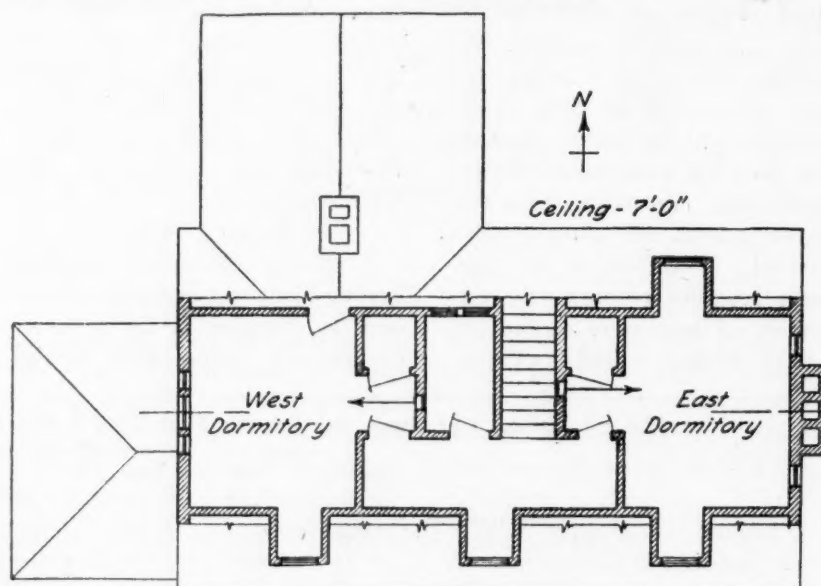


Figure 4. Third Floor Plan With Location of Warm Air Registers

curves of Fig. 6. Here the efficiencies as of the bonnet and as of the registers, for both hard and soft coal, are shown. With hard coal it is indicated that whereas 59 per cent of the heat of the fuel was available at the bonnet, only 44 per

at the bonnet and that delivered at the registers was not a real loss. The loss from the stacks served to warm the walls and to make up a heat loss that otherwise would have had to have been supplied by the air in the rooms, and the radiation and

convection from the leader pipes was available for warming the first story floors. Any heat loss between the bonnet and registers or from the furnace casing and smoke pipe must of necessity remain in the house. The heat may not be utilized to the best advantage, but it is by no means a total loss.

In the same way the heat loss from an inside chimney is available for heating the house. For an indication of the magnitude of the heat available within the residence from the smokepipe and chimney see the flue gas temperature curves of Fig. 8 and the total heat loss curves of Fig. 9. In the former figure the flue gas temperature drop in zero weather is $(570 - 190) = 380$ degrees for hard coal, and in the latter figure, the difference in the total heat loss at the furnace and the top of chimney is $(20.5 - 7.5) = 13.0$ per cent of the heat in fuel.

Over-all Efficiency of Residence and Heating System

The loss of heat from the top of the chimney, when an inside chimney is used, is the only ultimate loss of heat from the house. By subtracting from 100 the percentage losses at the top of the chimney, as shown by Fig. 9, the over-all efficiency of the house and heating installation may be determined. This has been done, and the efficiency curves are shown in Fig. 10. When hard coal was fired, the over-all efficiency ranged from 92 to 97 per cent, averaging 95 per cent for average weather. With soft coal, the over-all efficiency averaged 75 per cent.

These over-all efficiencies have also been determined by another method, consisting of an accurate calculation of the heat loss of the building and a comparison of this loss with the heat generated on the grate. A few points based on this method of estimating over-all house efficiencies are shown plotted in Fig. 10 for hard-coal and soft-coal operation. Each point represents the average of several daily tests with each fuel; and the agreement between the points and the curves in-

dicates that the curves are a fair approximation of the overall thermal efficiency in the house.

Close agreement between the curves and the overall house efficiency for any one daily test cannot be expected, since it is quite impossible to make a correct estimate of

ciies, it is evident that a large percentage of the heat found its way into the rooms of the house by indirect paths such as through the floors and walls and from the chimney surfaces. An estimate of this indirect heat is shown in Table 2. With either hard or soft coal, the

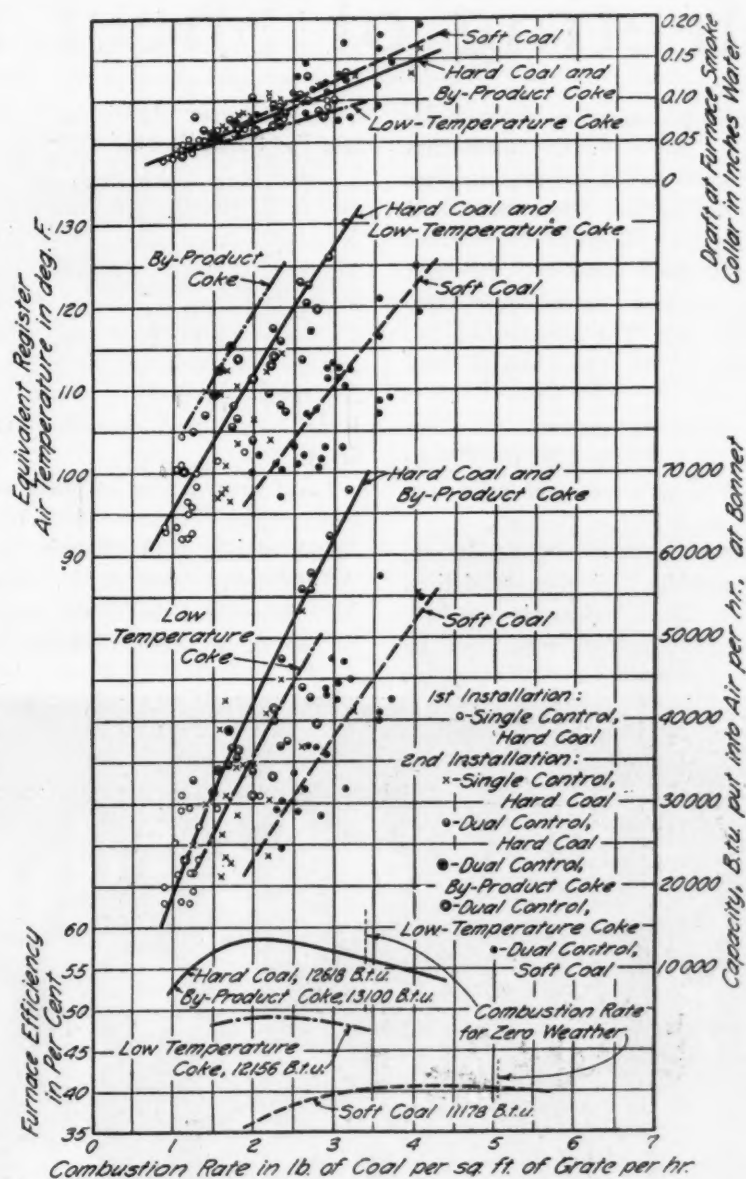


Figure 5. Performance Curves for Hard and Soft Coal and Coke

the exact heating load on any given day. Averages for several days, based on estimated daily heat losses for similar days, are much more reliable values and were, therefore, used in Fig. 10.

Bearing in mind that the residence was heated to 70 degrees Fahrenheit with high overall house efficiencies but with low register air temperatures and register efficien-

indirect heat exceeded in amount the heat delivered at the registers.

While the indirect heat exceeded the heat delivered at the registers, its distribution was such that the house was uniformly heated. The average temperature at the breathing level for the first story, based on 10 tests, was 70.7 degrees Fahrenheit. For the second story the
(Continued on Page 212)

RECORD TURNOUT *at* Bloomington, Indiana, District Meeting of Sheet Metal Men

THE Bloomington, Indiana, local sheet metal contractors were hosts on the evening of June 21 to the Indiana Sheet Metal and Warm Air Heating Contractors and Fur-Mets (traveling salesmen of organization) at the Hotel Graham at 6:30. The occasion was the meeting of the Bloomington District.

After the banquet, W. G. Clevenger, local secretary of the Chamber of Commerce, welcomed the guests on behalf of the city.

Frank Anderson, of Terre Haute, state president of the association, was master of ceremonies.

The main address was given by

a local architect. He spoke on "Do We Love Our Craft."

Eminent guests were J. E. Merrick of Louisville, president of the National Association of Sheet Metal Contractors; State Executive Secretary Jos. C. Gardner, Indianapolis, past national president and present national treasurer; Frank Anderson, Terre Haute, State President, and Paul R. Jordan, Indianapolis.

Local firms acting as hosts were Bloomington Radiator and Sheet Metal Works, H. G. Harris, Wm. A. Reinhardt, and A. P. Hayes. Mr. Hayes was the oldest member of the trade present, having fol-

lowed the profession 63 years.

As a surprise to Cleve Branham of the Bloomington Radiator and Sheet Metal Works, and Governor of the Bloomington District, the Indianapolis delegation gave him a huge birthday cake, it being his birthday. The cake appeared to be very appetizing, but all were disappointed when an attempt was made to cut it, as it was found to contain many valuable gifts ranging from ladies silk hose to one-pound all day candy suckers.

The meeting was voted a most successful event by all who attended.

A mishap occurred to the car in



1. Otis Burton, 2. Hubert C. Jones, 3. Wm. A. Reinhardt, 4. E. C. Read, 5. O. B. Herman, 6. Charles H. Wilkinson, 7. Robert Renick, 8. H. W. Schmidt, 9. R. D. Stump, 10. Thomas Ewing, 11. E. F. Alexander, 12. Burns Currie, 13. O. A. Nichols, 14. R. E. Higgs, 15. W. R. Davis, 16. Guy Lefforge, 17. H. A. Beaman, 18. John S. Neal, 19. W. G. Clevenger, 20. Bert Myers, 21. Wm. Jordan, 22. H. E. Griffin, 23. H. C. Kern, 24. C. C. McManama, 25. George C. Joslin, 26. Raymond Ramage, 27. W. M. Class, 28. H. G. Harris, 29. H. R. Jones, 30. Henry Ewing, 31. A. Arnold, 32. John C. Henley, 33. A. J. Hays, 34. Alfred E. Grindle, 35. O. Voorhees, 36. Joseph C. Gardner, 37. Frank J. Doyle, 38. E. M. Baxter, 39. F. E. Anderson, 40. Paul Jordan, 41. Alfred C. Selvig, 42. James A. Thomas, 43. Homer Selch, 44. W. S. Waters, 45. Tom Savey, 46. H. F. Bowers, 47. Earl W. Thixton, 48. Jesse E. Bowers, 49. Jack Branham, 50. Milton Branham.

which National President J. E. Merrick and several other men were proceeding to the meeting from Louisville.

At Smithville, Indiana, their car crashed through the railing of a bridge over the Monon railway and went over the embankment into a restaurant. Although the restaurant was a wreck, only slight damage was done to the car.

The accident occurred, according to the report, when A. L. Fink, who was unfamiliar with the road, made a sharp turn on the bridge and lost control of the car, which then went through the guard railing.

Those in attendance were:

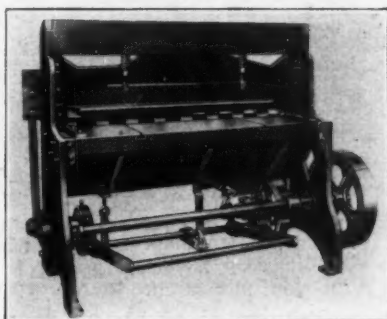
H. G. Harris, Bloomington; E. F. Alexander, Bloomington; O. B. Herman, Indianapolis; R. E. Taylor, Cleveland, O.; R. D. Stump, Indianapolis; W. G. Clevenger, Bloomington; F. E. Anderson, Terre Haute; W. S. Waters, Indianapolis; Joseph C. Gardner Indianapolis; Guy Lefforge, Indianapolis; E. M. Baxter, Indianapolis; Wm. C. Loesch, Columbus, Ind.; W. V. Salkeld, Columbus, Ind.; Jack Branham, Bloomington; Homer Selch, Indianapolis; Tom Lavey, Indianapolis; Henry Ewing, Huntington; Thomas Ewing, Huntington; Raymond Ramage, Bedford; Otis Burton, Orleans; R. E. Higgs, Indianapolis; W. R. Davis, Martinsville; H. E. Griffin, Bedford; H. C. Kern, Indianapolis; Albert F. Fink, Louisville, Ky.; Charles M. Schott, Louisville, Ky.; Thomas E. Hayden, Louisville, Ky.; J. E. Merrick, Louisville, Ky.; H. R. Jones, Indianapolis; Charles H. Wilkinson, Bloomington; Robert Renick, Indianapolis; E. C. Read, Bloomington; Milton Branham, Bloomington; William Jordan, Indianapolis; O. A. Nichols, Indianapolis; H. A. Beaman, Indianapolis; Burns Currie, Mitchell; Frank J. Doyle, Indianapolis; Winston Johnson, Louisville, Ky.; H. W. Schmidt, Indianapolis; George C. Joslin, Indianapolis; John C. Henley, Indianapolis; A. J. Hays, Bloomington; Wm. A. Reinhardt, Bloomington; Hubert C. Jones, Indianapolis; John S. Neal, Bloomington; Raymond Fuson, Bloomington; Jere J. Doherty, Indianapolis; Bert Myers, Bloomington; C. C. McManama, Indianapolis; O. Voorhees, Indianapolis; H. S. Fiffin, Lima, O.; Wm. Stewart, Indianapolis; Harry B. Putman, Indianapolis; A. Arnold, Indianapolis; Earl W. Thixton, Salem; H. F. Bowers, Salem; Jesse E. Bowers, Salem; Alfred C. Selvig, Indianapolis; W. M. Class, Indianapolis; James A. Thomas, Indianapolis; Mrs. C. C. McManama, Indianapolis; Mrs. F. E. Anderson, Terre Haute; Betty Anderson, Terre Haute; Mrs. H. G. Harris; Mrs. Cleve Branham; Mrs. Bert Myers; Alfred E. Grindle, Bloomington; Paul R. Jordan, Indianapolis.

If you have any inquiries, please make them to our Notes and Queries Department and they will receive prompt attention.

Dreis & Krump Has New Light Type Under Drive Shear

The Dreis & Krump Manufacturing Co., manufacturers of Chicago steel bending brakes and sheet metal working machinery, 7404 South Loomis Boulevard, Chicago, U. S. A., has developed a light type under drive shear.

This type shear differs from the heavier shears in regard to the driv-



The Shear

ing mechanism, being two shaft drive with jaw type clutch, instead of three, the shaft drive with friction clutch. When the treadle is fully depressed the upper knife bar makes one complete stroke and stops at the highest point, unless the treadle is held depressed which would keep the upper knife bar in continuous motion. Unless it is desired to keep the upper knife bar in continuous motion it is not necessary to hold the treadle depressed while the shearing operation is performed.

Provision is made so that the clutch cannot engage unless the treadle is fully depressed. The clutch jaws are faced with tool steel to insure long wear and can easily be replaced if necessary.

These machines are primarily designed for 14-gauge in three to twelve foot lengths and the short 10 gauge and 3/16 inch shears. They are especially adapted for factories where speed is essential in cutting the lighter gauges.

These shears also embody the steel plate welded construction feature, and are unbreakable and non-deflecting.

Complete guarding on front, rear, and sides of the shears covers the mechanism, keeping it free from all

dirt, scale and entanglement with scrap and trimmings and is also a safety feature.

Full information can be had by writing the company.

Fred P. Calkins Dies After Operation for Appendicitis

Fred. P. Calkins, the dean of Richardson & Boynton Company's western division, passed away recently as the result of an acute appendicitis attack.

Mr. Calkins was originally located at Saranac Lake, New York, and operated from that point for twenty-eight years through the Adirondack Hardware Company.

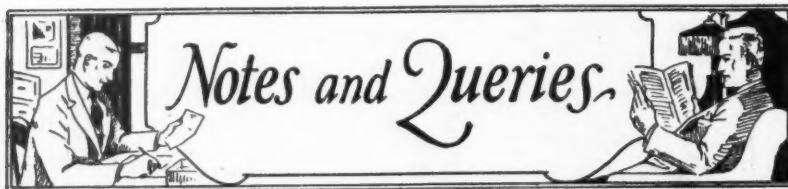
He transferred his headquarters to Richardson & Boynton Company's Chicago office on January 1, 1913, and since that time had been unusually active as field representative, particularly throughout the



Fred P. Calkins

Chicago metropolitan and northern Illinois area.

Members of the Richardson & Boynton Company feel his loss very keenly, as he was a loyal, enthusiastic and energetic member of their staff, and had many friends throughout both the eastern and western districts who will miss him very much.



Notes and Queries.

"Bay State" Furnace

From V. D. Tucker, 420 North Third Avenue, Canton, Illinois.

Will you please send me the address of the company making the "Bay State" furnace?

Ans.—Barstow Stove Company, Providence, Rhode Island.

Window Sticker "Artisan in Sheet Steel"

From Charles F. Tolg and Son, 238 Broadway, Waukesha, Wisconsin.

Some time ago we received a window sticker—"Artisan in Sheet Steel." We do not recall who sent it and would like to get several more like it. Can you give us this information?

Ans.—Sheet Steel Trade Extension Committee, Terminal Tower Building, Cleveland, Ohio.

Oil Burners for Tar Kettles

From The Star Steel Supply Company, 7516-22 Oakland Avenue, Detroit, Michigan.

Kindly tell us who make oil burners for tar kettles.

Ans.—Aeroil Burner Company, Incorporated, Park Avenue at 13th Street West, New York City; The Joseph Hornhorst Company, 1016 West 6th Street, Cincinnati, Ohio; Littleford Brothers, 430 East Pearl Street, Cincinnati, Ohio; Benjamin K. Lyman and Company, 2107 West Lake Street, Chicago.

Overhead Heating System for Garage

From A. Conzelman, Manager Round Oak Heating Company, 122 South Vermillion Street, Streator, Illinois.

Who makes an overhead system of heating for garages, the system being a gas heater suspended from the ceiling, with a fan attached which blows the heat downward?

Ans.—General Gas Light Company, Kalamazoo, Michigan.

Oil Burners for Cook Stoves

From A. W. Dietzel, 207 East 4th Street, Hermann, Missouri.

I should like to know what firms manufacture an oil burner for use in a cook stove.

Ans.—International Oil Heater Company, St. Louis, Missouri; Gloria Light Company, 112 North

May Street, Chicago, and Silent Glow Oil Burner Company, Hartford, Connecticut.

"Barthel" Plumbers' Furnaces

From Western Plumbing Supply Company, 3328 Fillmore Street, Chicago.

Please advise us who manufactures the "Barthel" line of plumbers' furnaces.

Ans.—Globe Gas Light Company, Boston, Massachusetts.

Oil Heating Apparatus for Heating Ovens Used in Bakeries

From Carroll Plumbing and Heating Company, South Main Street, Sandwich, Illinois.

Can you put us in touch with manufacturers of oil heating apparatus for heating ovens used in a bakery?

Ans.—Winslow Boiler and Engineering Company, 844 Rush Street, and North American Manufacturing Company, 404 North Paulina Street, both of Chicago.

Porstelain

From American Roofing Company, 2140 Gratiot Avenue, Detroit, Michigan; Reinick and Krueger Company, 106 North Francis Street, Madison, Wisconsin; Fortier's, 273 South Schuyler Avenue, Kankakee, Illinois.

Please tell us who makes "Porstelain"—the sheet metal tile referred to in your article on pages 168 to 170 of your June 22nd number.

Ans.—Porcelain Tile Company, 228 North LaSalle Street, Chicago, Illinois.

"Hardinge" Oil Burner

From Schleicher Sheet Metal Company, 228-30 Mill Street, Kenmore, Ohio.

Can you tell us who makes the "Hardinge" oil burner?

Ans.—Hardinge Brothers Inc., 4149 Ravenswood Avenue, Chicago.

Specialties in Wire

From Palm Sheet Metal Works, De Land, Florida.

We should like to know who makes special articles in wire.

Ans.—F. P. Smith Wire and Iron Works, 2346 Clybourn Avenue; Peerless Wire Goods Company, 6 North Michigan Avenue; The Kerr Wire Products Company,

319 North Whipple Street; Searles Electric Welding Company, 1850 Fulton Street; Union Steel Products Company, 841 West Randolph Street; all of Chicago.

Silvered Hollow Back Jewels for Bicycle Tail Lights

From J. L. Modrell, Box 512, Mackinac Island, Michigan.

Where can I secure silvered hollow back jewels to be used for bicycle tail lights, to be about 1½ inches in diameter with a narrow metal rim?

Ans.—New England Mills Company, 851 West Washington Boulevard, and E. Marx and Company, 208 West Washington Boulevard; both of Chicago.

"Roberts" Portable Oven

From Lincoln Stove Repair Company, Lincoln, Nebr.

Please inform us who makes the "Roberts" portable oven.

Ans.—Roberts and Mander Stove Company, Philadelphia, Pennsylvania.

Garden Ornaments

From Holmes Brothers, Inc., 427 East Jefferson Street, Syracuse, New York.

Will you please tell us who makes garden ornaments in bronze, iron, lead or other suitable material for such subjects as a bullfrog, kneeling girl, etc.?

Ans.—Friedley-Voshardt Company, 733 South Halsted Street, Chicago, and Gerock Brothers Manufacturing Company, 1252 Vandeventer Avenue, St. Louis, Missouri.

Metal Colored Tile in Northern Indiana

From Milwaukee Corrugating Company, 4301 South Western Avenue, Chicago.

Can you give us the name of the concern in northern Indiana (we believe it is Misawaka) that makes individual colored tile of 16-gauge galvanized iron, which is set in cement that does not harden but retains the tile in place?

Ans.—The Duratile Company, Mishawaka, Indiana.

This department is maintained for the use of our subscribers and we want all of them to feel free to use it at any time. Answers are sent by mail direct if subscribers desire to have them that way.



Shop Front of South Shore Sheet Metal Works, 2216 East 75th Street, Chicago,
Showing Use of Neon Sign in Green

NEON SIGN FLASHES SHEET METAL CONTRACTOR'S SLOGAN *To the Chicago Public*

INDUSTRY in general has a pretty definite idea of the tangible value contained in a slogan or a short, catchy phrase which is easily remembered and which at the same time calls attention to the products which the company using the slogan handles.

Progressive sheet metal men have not been slow to see the advantage of this type of advertising; neither have they been hesitant about using the Neon electric sign tubing to call attention to their business.

In the accompanying illustration we show the store and office front of the South Shore Sheet Metal Works, 2216 East 75th Street, Chicago, Illinois. This progressive company has a slogan which reads,

"Let It Rain," implying that the householder need have no worry concerning the weather and its tendency to weep, as the company is in a position to take care of all kinds of weatherproofing.

"This slogan," said John F. Browne, President of the South Shore Sheet Metal Works, "which is registered in the U. S. Patent Office, is made up of Neon electric tubing in green. At night this sign attracts unmistakable attention to our slogan and business.

"You will note the transparent paint work on the lower part of the plate glass window, which does not in any way shut out the light. Our firm name is worked in above the painted panel in such a way as to

resemble a sheet metal panel with the letters cut from the same material. Below this we have our address painted into the panel. On the plate glass returns you will note, "Skylights, Gutters and Downspouts," cut out in the same manner as our name. Below this there is another branch of our work listed, "Contracting and Plant Maintenance."

The South Shore Sheet Metal Works does not confine its business getting activities to the signs on the windows. In fact, this is only one of the many methods employed. The company does a great deal of direct-by-mail work and the slogan has a prominent place in all mailing pieces that go out.



ALFALFA PROCESSERS and Find SHEET METAL Against *Fire* and the

By C. H. THOMAS

WOODWORKING plants generally are not covered with sheet metal, but the Oxford Woodworking Plant at Oxford, Pennsylvania, is an outstanding exception that will bear close inspection.

Here, sheet metal has been used to cover all roof surfaces, protecting the valuable machinery and equipment that go with a plant of this size. The immense sheet metal blower shown in the picture is one of the largest in this section of the country and into it all of the waste products are gathered and shunted to a car on the siding nearby. It contains several hundred square feet of sheet metal.

The use of sheet metal on a plant of this size gives it a safety that can easily be figured, because the fire menace is ever present. Therefore the roof is one of the places where fire could easily catch and be trans-

ferred to other portions of the plant, causing serious damage.

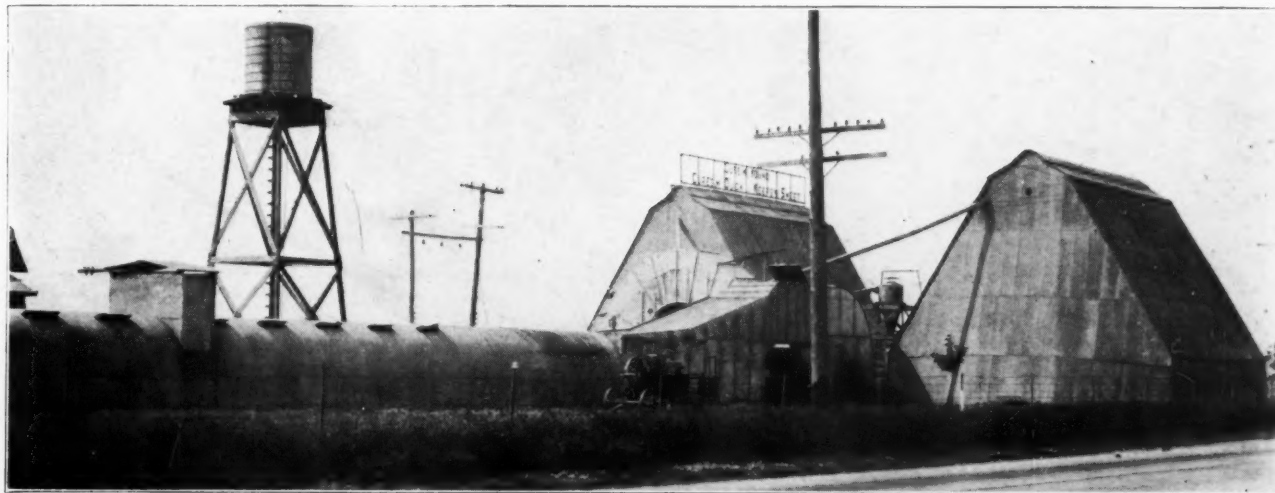
The block portion of the walls is, of course, fireproof, and the roof being so, makes this woodworking plant, where hundreds of thousands of dollars worth of very valuable material is handled, as near fireproof as can be done.

This plant is near the main road from Washington to New York and has been the source of many inquiries as to the reason for and why of this roofing on all of the buildings, some of which cannot be seen in the picture.

The work was done by local con-



Wood Working Plant at Oxford,
Process Co., Wilmington, Del., use S
Building Note



and LUMBER MILLS Gives Protection the Elements

tractors who sensed the value of this sheet metal covering; the owners, of

course, being already sold on the increased value of their plant and the safety item involved, so the question solved itself with every one in accord on the matter of using sheet metal.

The advertising value of sheet metal has here gained a great impetus because when a large plant like this uses this material other lesser concerns and any larger ones can easily see that they might use it

and thus contribute to their own safety and that of others. By using sheet metal they are using a mate-

rial that helps their fire insurance rates and protects their own plants.

Another source of business for the sheet metal contractor is the agricultural field, where a great many of the implements are constructed largely of sheet metal. These are in need of repair frequently and the sheet metal contractor can pick up a considerable business in this manner if he wants to go out after it.

Two of the accompanying illustrations are those of the Mason Alfalfa Process Plant near Wilmington, Delaware, where all of the buildings are covered with sheet metal.

In the illustration in the upper right hand corner is shown one side of the Mason Alfalfa Processing plant near Wilmington, Delaware. All of the buildings are covered with sheet metal.

The illustration on the upper left gives a second view of the same plant from a different angle. The buildings and the machinery around them are adequately protected against loss or damage by fire or deterioration.

In the center below is a view of the Oxford Woodworking Plant, Oxford, Pennsylvania.



Oxford, Penn., and Mason Alfalfa
use Sheet Metal Extensively for
Protection.

THE COMPOUND ELBOW

Instruction on Its Pattern Design

CONSIDERING

Heel and Throat Construction

SOME time ago a subscriber asked for a method on making compound elbow and also inquired if it was possible to make a compound elbow in several pieces for sheet metal duct work.

It is decidedly easier to make a compound elbow in several pieces than it is in one part. A compound elbow is nothing more or less than two 90-degree elbows, which can be assembled in the center or left in the patterns so both elbows will make a double turn.

There are many workmen who use two elbows for making compound turns and in unexposed work, as in attics or hidden parts of basements, etc., it serves its purpose just as well. But where the work is exposed it is often more artistic to make double elbows in one piece, thereby making compound turn.

Explaining the Development

To develop a compound elbow in one piece for each side, we work on the basis that the one side gives length and the other gives the width. We draw the plan and the elevation to conform with our measurements.

Sometimes a larger radius is used and other times the sections are also transformed to take on different measurements than merely rectangles reversed. But such are mechanical details that must be applied and can readily be overcome in one or several ways.

Now observe that in passing lines

from our elevation view through the plan it is as though we have parallel planes through each line, or in other lines as though you draw a line square to the position shown clear around the fitting in each plane.

It is, therefore, enough to draw lines through at random, since it is more important to place the lines so they will enable getting greater accuracy in certain curves, where lines can be placed closer together than if an equal number of divisions were made.

How to Get Pattern for Heel

So to lay off the pattern we pick the girth along the side I as A-B and set it as in pattern I for heel, as A'-B'.

From each of these points we erect lines and then from each point where vertical lines cross plan in throat E-F and also the heel G-H we carry over horizontal lines to cut off these lines in pattern of similar number.

In this way we develop the curve as shown and this gives the pattern for the heel I.

Obtaining Pattern for Throat

To develop pattern for throat of elevation II, we pick the girth C-D and set it to left of plan, as C'-D', and erect lines as before; then project points over from plan which gives the proper width of pattern as well as length.

Now to develop pattern for throat of plan III we pick the girth E-F

and set it as E'-F' and then drop stretchout lines after which lines are carried over from the throat and heel of elevation used, which enables sketching lines through all points where lines intersect and you have pattern for side III.

The same procedure is followed for pattern for side IV by picking girth G-H and setting it as G'-H and then develop it as shown.

Hints on Shaping

But in making these elbows some trouble is met with in assembling, and so the best method is generally either to rivet them as M or to double seam them as at N.

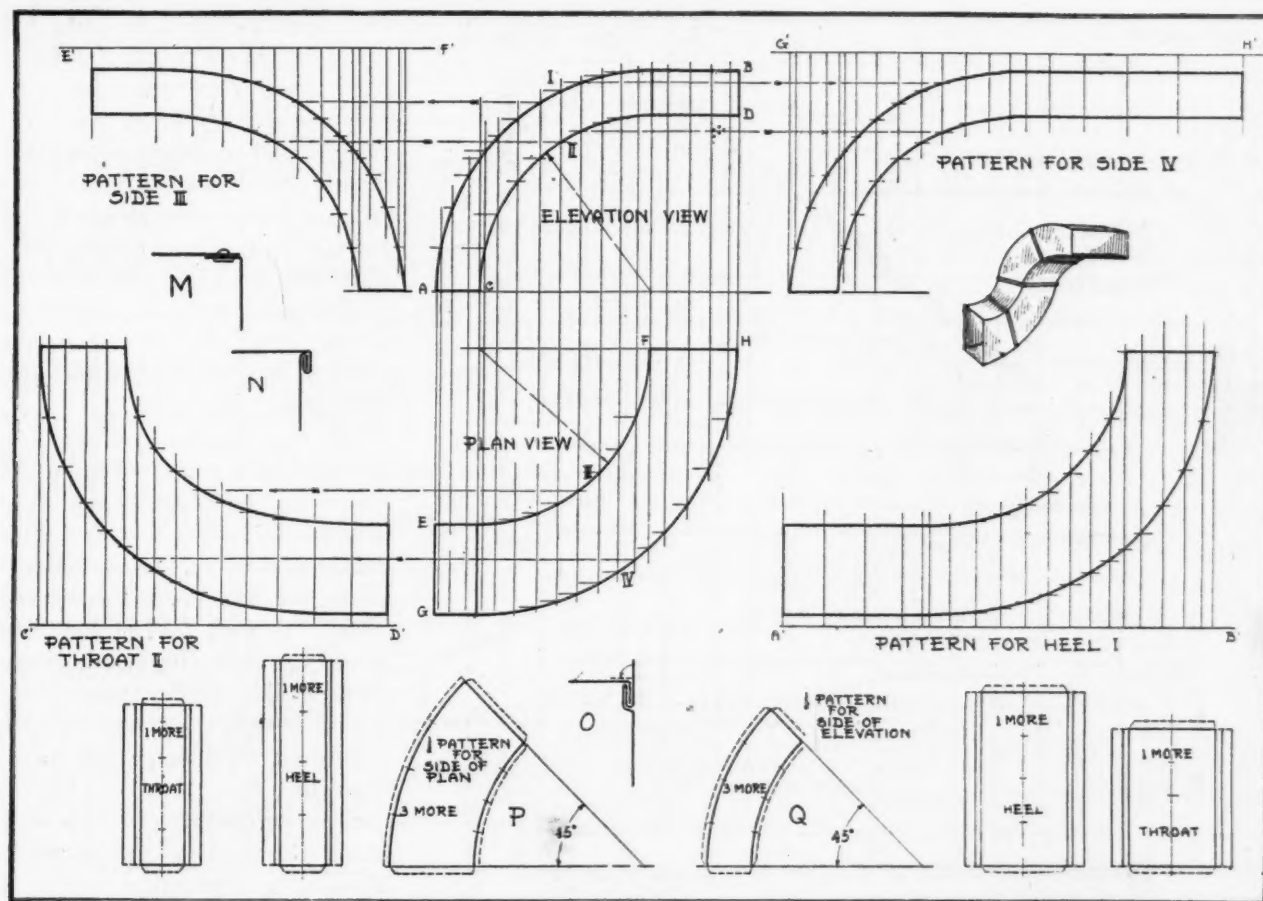
There are also other methods of doing this, as on heavier work the edges can be welded, and there is also a type of hammered lock that can be used with some satisfaction, if a workman knows how to handle it.

In shaping these patterns up, the elevation and plan outlines should be used as a template in order to bring the approximate shape, as this will make easier working for assembling.

Elbows of this kind, with a large radius in throat, are more conveniently handled than those with a short radius, owing to the double twist that must be made in the turn between the two elbows.

In making these elbows out of 4 pieces only a part elevation or plan need be drawn, as we show at P and Q.

These views also become patterns for those portions of the elbow and



Pattern for Compound Elbow

all that is necessary is to lay off the throat and heel which are straight strips and which can be assembled by means of hammered lock O.

When these several parts are assembled, it is then possible to cap strip each part of an elbow on the job in position, which is especially advantageous for large work, since fittings of this kind are always more or less awkward to handle.

Want to Get Into the Neon Sign Business? Here's a Chance

If business is bad, you either get out and hustle around for more or you look for opportunities to switch to some other line of work with as little difficulty as possible.

The sheet metal contractor has found himself, in many instances, hard put to it to find work enough to keep him going during a dull period.

Here's a splendid opportunity to extend your present activities without the necessity of changing your equipment. Just an opportunity such

as the sheet metal contractor has been seeking for a long time.

The American Neon Light Corporation, 559 West 132nd Street, New York, is offering a limited number of responsible firms engaged in the sheet metal industry to extend their present activities and enter the Neon sign business.

The manufacture of signs is so closely allied to the sheet metal business that such an opportunity should be very welcome indeed to sheet metal contractors who are attempting to extend their pursuits.

For full details, write to the American Neon Light Corporation, 559 West 132nd Street, New York City. Write at once, as only a limited number of sheet metal contractors will be given the franchise, and selection will be made according to priority as well as general fitness.

Niehaus Furnace Co. Has New Furnace Repair Catalog

The Niehaus Furnace Repair Company, Cleveland and Cincin-

nati, Ohio, have recently issued what they consider the most complete list of furnace repairs and prices in existence and they are thoroughly justified in their consideration.

The booklet is designated as Catalogue H, and contains the names of more than 270 warm air furnaces, their manufacturer's name and the prices of the repair parts stocked or which the Niehaus firm can supply on request.

In addition, the book contains the names of more than 63 boiler manufacturers and the products they make, together with the prices of the repairs that can be furnished.

This complete list represents a stupendous amount of work on the part of the Niehaus Furnace Repair Company, and is indeed a credit not only to that company, but to the entire industry which it represents.

Copies of this new listing of furnace repairs should be in the active files of every warm air furnace installer in the country. It is a ready

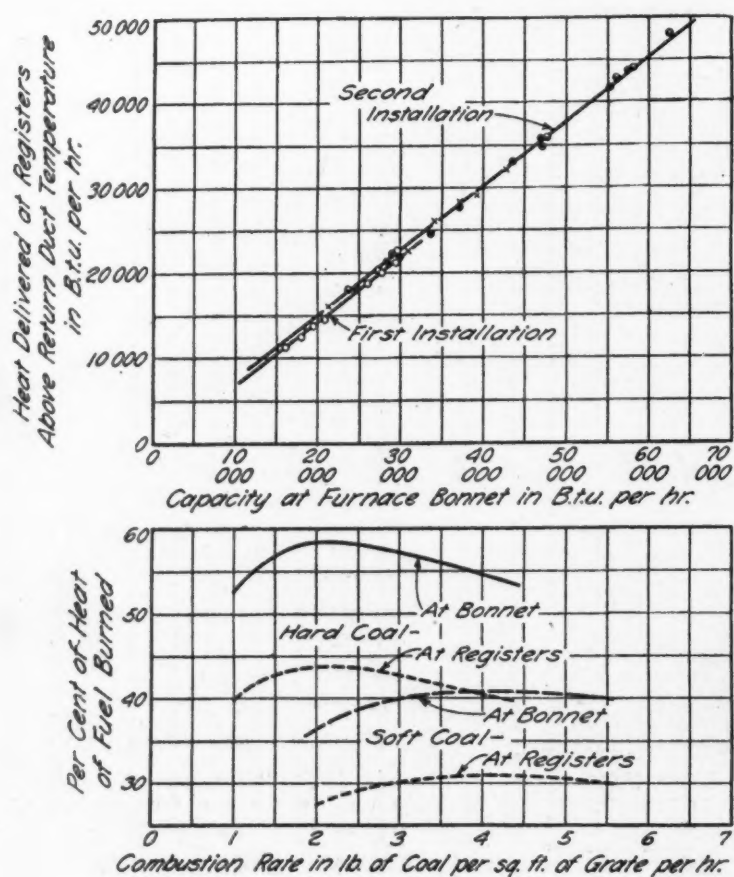


Figure 6. Leader and Stack Losses, and Efficiency as of Registers

the general performance curves of Fig. 5 it may be noted that for a given combustion rate, soft coal gave a materially lower efficiency, capacity, and equivalent register air temperature than hard coal. Thus soft coal gave an overall house efficiency of only 75 per cent as compared with hard coal efficiencies of over 90 per cent. An analysis of the data obtained while burning the two fuels indicates the cause of this difference.

The flue gas loss consists of a sensible heat loss and a loss resulting from unburned combustible constituents. Figs. 8 and 9 show the comparison of flue-gas temperatures and heat losses for the two fuels. For each kind of fuel four curves are shown representing the temperature of the flue gases at four points in their passage through smokepipe and chimney. The curves show that at a given combustion rate the flue-gas temperatures were almost the same for the two fuels. Thus at a combustion rate of 3

ANALYSIS

(Continued from Page 203)

average was 70.1 degrees Fahrenheit, and for the third story it was 67.0 degrees. The average outdoor temperature for the 10 tests was 29.0. The maximum deviations from the average occurred in the southwest bedroom, where the breathing level temperature was 73.0 degrees Fahrenheit, and in the northwest bedroom where it was 66.4 degrees Fahrenheit. The low temperature in the northwest bedroom was caused by an unfloored attic space above the room. This condition was later corrected by nailing two layers of $\frac{1}{2}$ -inch quilt insulation on top of the floor joists in the attic. When this was done, the breathing level temperature rose to 69.7 degrees Fahrenheit. Hence, it is evident that the heat delivered at the registers was ample to serve as a control and to produce uniform temperatures throughout the house.

Performance on Hard and Soft Coal

The results indicate a considerable difference in plant performance between hard and soft coal. From

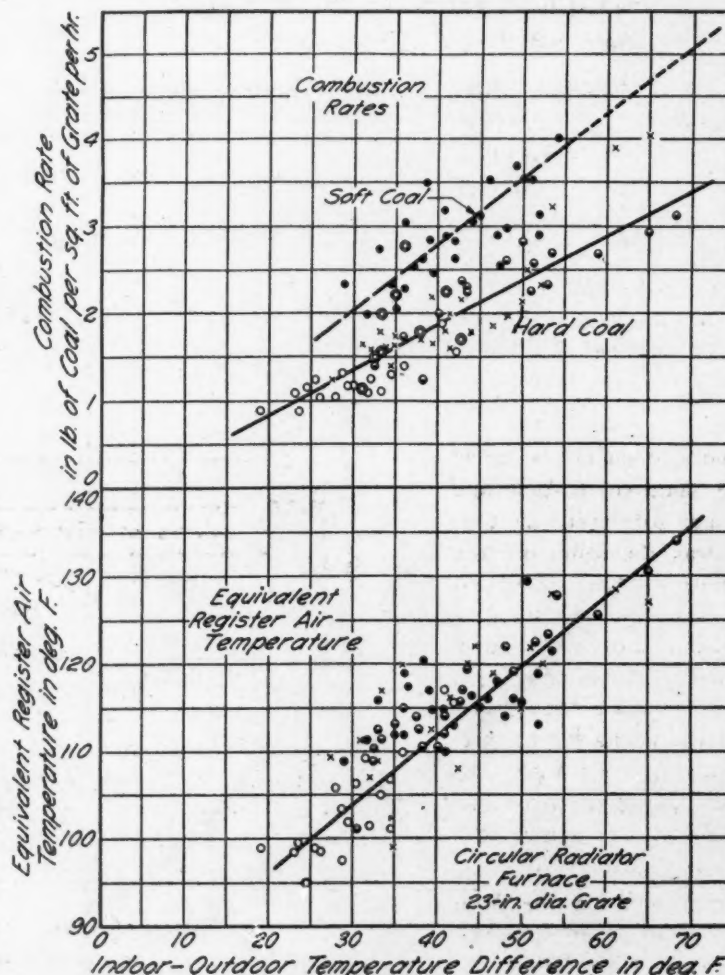


Figure 7. Register Air Temperature and Combustion Rate Curves for Various Outdoor Temperatures

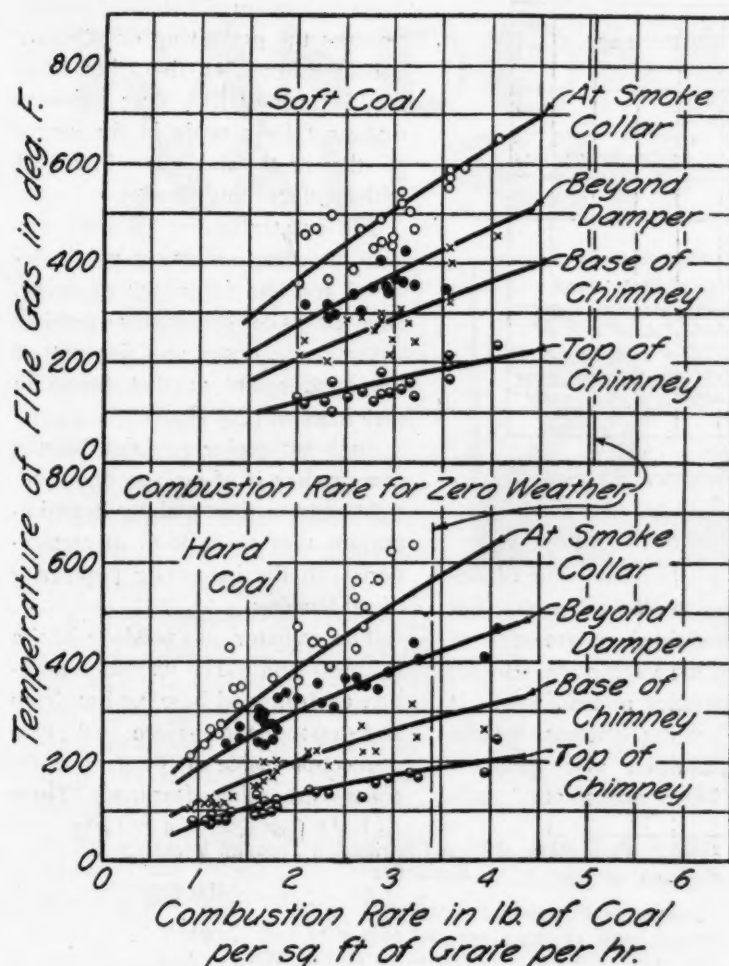


Figure 8. Flue-Gas Temperatures for Hard and Soft Coal

Analysis of the flue gas showed no hydrogen or carbon monoxide for hard coal, but for soft coal they indicated 2 per cent free hydrogen and 1 per cent carbon monoxide. This amount of free hydrogen represented a loss of approximately 1,100 B.t.u. per pound of soft coal burned, and the 1 per cent carbon monoxide represented a loss of approximately 500 B.t.u. per pound of coal burned. In addition there was more hydrogen in the soft coal than in the hard coal and hence the loss due to water vapor in the flue gas was greater. The total of these losses amounted to about 15 per cent of the heat value of the fuel.

This 15 per cent loss resulted in higher combustion rates with soft coal for given indoor-outdoor temperature differences than those obtained with hard coal. A contributing factor was the difference in heat value of the two fuels; 11,178 B.t.u. for the soft coal, as against 12,618 B.t.u. for the hard coal. The net result as shown by Fig. 7 was a 5-pound combustion rate with soft coal for a 70 degree indoor-outdoor difference, as compared with a 3.5-

pounds the curves show the following temperatures:

	Hard coal	Soft coal
Temperature at furnace, deg. Fahr.	520	510
Temperature at top of chimney, deg. Fahr....	175	170
(Temperature at top of chimney actually measured in chimney at roof line.)		

Furthermore, it should be noted that at the same combustion rate with hard and soft coal, the CO_2 percentage was the same in both cases. Therefore, the excess air and the weight of flue gas per pound of coal were approximately the same for the two cases. Hence at a given combustion rate, since the weight and temperature of the flue gas was the same for the two fuels, the sensible heat loss must have been the same. It therefore appears that the difference between the losses with hard coal and soft coal must have been largely due to unburned combustible in the flue gases.

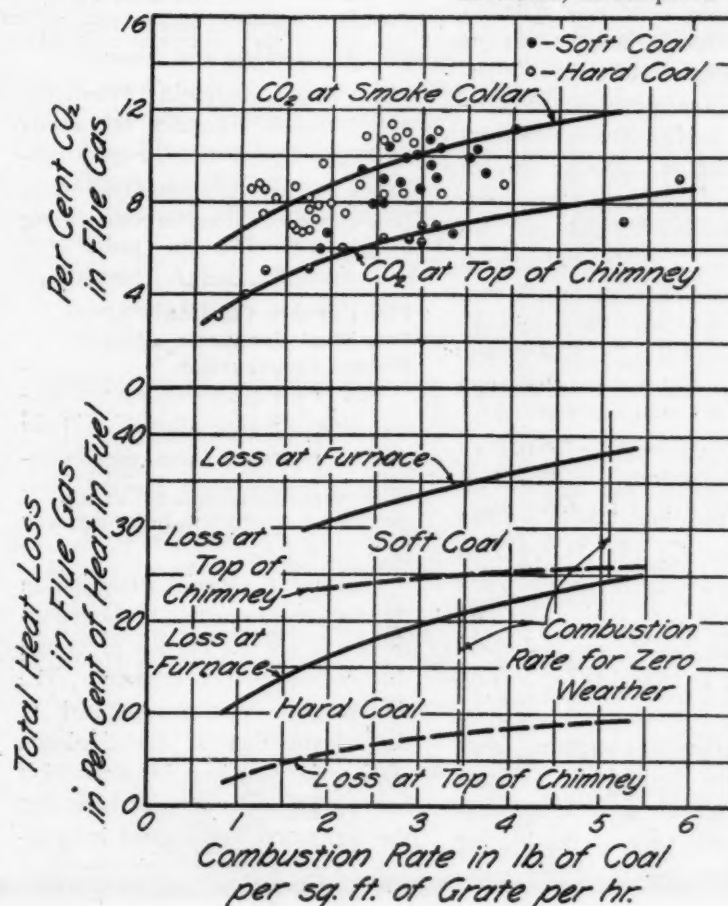


Figure 9. Flue-Gas Losses for Hard and Soft Coal

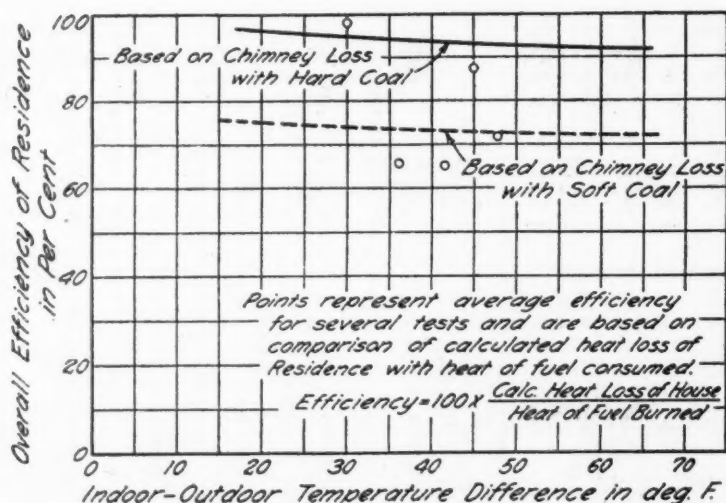


Figure 10. Over-All Efficiency of Residence

pound combustion rate with hard coal.

It has been indicated that at a given combustion rate the sensible heat loss in the flue gas was approximately the same for both hard and soft coal. But for soft coal the loss due to unburned combustible and increased water vapor, together with the lower heat value of the soft coal, resulted in a considerable increase in the combustion rate for a given indoor-outdoor difference. This increase was reflected in a higher flue gas temperature, as shown in Fig. 8, where the combustion rate for zero weather is indicated. A higher flue gas temperature represented a greater sensible heat loss, so that for a given indoor-outdoor difference the soft coal also had a greater sensible heat loss in the flue gases than the hard coal. This, however, was not a primary effect, but was brought about directly from chemical losses in the flue gases.

The combined effect of the 15 per cent chemical loss and the increased sensible heat loss in the flue gas accounts for the 20 per cent decrease in overall house efficiency when burning soft coal. The loss is entirely in the flue gas and could not possibly be available for heating the house.

The practice of comparing heating plants on the basis of boiler or furnace efficiency may be misleading. The efficiency of the heating unit and distributing system is im-

portant from the standpoint of delivering heat at desired points, but in a self contained system such as a residence, the vagrant heat by no means constitutes a dead loss. It raises the heating efficiency of the system as a whole and generally serves to warm floors and walls

Table 2. Percentage of Heat Distribution Through Research Residence

Fuel used	Hard coal	Soft coal
Overall house efficiency, per cent of heat of fuel....	94	75
Maximum efficiency at registers, per cent of heat of fuel	44	31
Difference or per cent of heat of fuel distributed through residence by indirect paths	50	44

where heat is desirable. When the overall house efficiency is considered, the actual heating unit efficiency becomes less important while combustion efficiency becomes more important.

Fox Furnace Co. Has New Steel Furnace Welded Construction

The Fox Furnace Company, Elyria, Ohio, manufacturers of the Sunbeam furnace, have recently developed a new steel furnace, production of which will be under way in a short time.

Features of especial attraction on this furnace, according to the manufacturers, are the Duplex grate and the greater firepot capacity. The duplex grate was incorporated in the construction of the Sunbeam 1000 series cast iron furnace and it has proved so successful here that the manufacturers deemed it advisable to employ it on their new steel

furnace. An upright shaking handle revolves the grate ring on 4 wheel bearings, removing the ashes from the fire pot walls. Any clinkers that may form settle in the center of the grate and are eliminated without disturbing the fire.

The greater firepot capacity was used in order to meet the public demand for less frequency of firing. The new design makes possible larger firing doors and fire pot of the same height as that found in cast iron heating plants.

Sunbeam engineers claim that the new product is of leak-proof, fume-tight construction, making it an important unit to be used in connection with the increasing popularity of oil burning.

The radiator is welded into a seamless unit. The welded connection at drum and base, and at drum and top; the one-piece cast iron connection inside of the steel smoke collars are other features. There

are no joints to open. are interested, can obtain complete information by communicating with the Sales Promotion Department of The Fox Furnace Company, Elyria, Ohio.

Additional innovations claimed for the new product, are being illustrated and described in literature now being prepared. Dealers who



The New Furnace

RANDOM NOTES AND SKETCHES

Frank Anderson of Terre Haute, Indiana, will enjoy this one.

"You're looking fine," announced the doctor to his patient. "Have you followed my dieting instructions and eaten only what a three-year-old child would?"

"Yes, doctor," was the sad reply. "For dinner I had a handful of mud, one of coal dust, a button hook and a box of safety matches."

* * *

Frank Reinick, Madison, Wisconsin, ought to laugh at this one.

A young lady hailed an old-fashioned horse-drawn vehicle, there being no taxicab in sight. Just as she was getting in she noticed the horse seemed to be frisky. He was jumping about and swishing his tail in a way that alarmed her—she was a timid little thing.

So she addressed a few words to the aged driver.

"I hope," she said, smiling bravely, "that you will not run away with me."

The cabby sighed mournfully.

"No mum," he replied. "I have a wife and seven kids at home already."

* * *

Bill Waters of Indianapolis can appreciate this one.

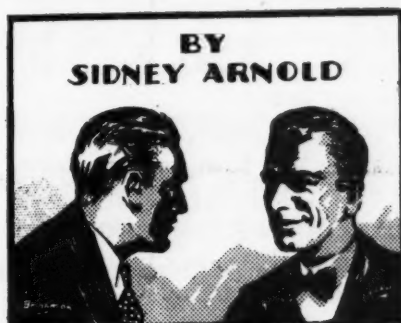
The prosecuting attorney had encountered a rather difficult witness. At length, exasperated by the man's evasive answers, he asked him whether he was acquainted with any of the jury.

"Yes, sir," replied the witness; "more than half of them."

"Are you willing to swear that you know more than half of them?" demanded the man of law.

The other thought quickly.

"If it comes to that," he replied, "I am willing to swear that I know more than all of 'em put together!"



Slow!

Fair American: "Oh, Algy, you English are too slow."

Englishman: Er—I'm afraid I don't grasp you."

Fair One: "Yes, that's just it."

He Fell—and How!

I had a suspicion he was about to. As the printers were locking up the forms to go to press, word reached us that Jack Stowell, Aurora, Illinois, has harkened to the Love Call.

He was married on Tuesday of this week at Wheaton, Illinois, to Miss Eva J. Wade.

Mr. and Mrs. Stowell are living at 712 New York street, Aurora, Illinois, and congratulations are in order. Whoopee!

Complete Retraction

"Half the City Council Are Crooks" was the glaring headline.

A retraction in full was demanded of the editor under penalty of arrest.

Next afternoon the headline read: "Half the City Council Aren't Crooks."



George Bushman, Aurora, Illinois, recounting some modes of living in the old times, told me that they didn't "make" whoopee; they "raised" it. And they didn't call it whoopee!

* * *

Irate Parent: "I'll teach you to make love to my daughter, sir."

Young Man: "I wish you would, old boy. I'm not making much headway."

* * *

He Took No Chances, but—

He brushed his teeth twice a day with a nationally advertised toothpaste.

The doctor examined him twice a year.

He wore his rubbers when it rained.

He slept with the windows open.

He stuck to a diet with plenty of fresh vegetables.

He relinquished his tonsils and traded in several worn-out glands.

He golfed—but never more than 18 holes at a time.

He got at least eight hours' sleep every night.

He never smoked, drank or lost his temper.

He did his daily dozen daily.

He was all set to live to be a hundred—

The funeral will be held next Wednesday. He is survived by eighteen specialists, four health institutes, six gymnasiums and numerous manufacturers of health foods and antiseptics.

He had forgotten about trains at grade crossings.

* * *

But how could you tell, darling, that I never proposed to any other girl?

Because you were not married, she murmured rapturously and admiringly.

Steel Position Good for Midyear

Order Books Unexcelled for Period—More Interest in Pig Iron—Semifinished Probably \$35—Carriers Place Rails and Equipment

MOST steel producers are coming up to mid-year with the best order books in their history for that period. Not since 1920 have so many departments of the industry embarked on the third quarter with July output substantially sold and considerable August tonnage earmarked.

Specifications and shipments of finished steel continue to turn down moderately, under seasonal influences, but third quarter contracting is brisk, considering the generally stable price situation and the fore-running record six months. Compared with a year ago, third quarter commitments of many consumers show an increase.

Contracting for third quarter pig iron is more active, many automotive foundries now being in position to foresee their needs more clearly. In some cases these requirements are within 20 per cent of the second quarter melt. Especially at Pittsburgh and St. Louis is more interest in iron manifest, and southern producers to move their surplus are competing in northern markets on an equal price basis for the first time in a decade.

Base prices on heavy finished steel are generally firm, with delivery a paramount consideration in many cases.

In semi-finished steel the markets at Pittsburgh, Youngstown and Cleveland appear to be settling to a \$35 base, though some makers—chiefly those with little material to sell—hold to the advanced level of \$36 for sheet bars, billets and slabs.

Melters are showing more interest in third quarter pig iron requirements at Pittsburgh, and contracting has increased.

Most of the business is being placed with regular sources of supply, and open market inquiries are not numerous. Westinghouse Electric & Mfg. Co.'s inquiry for Traf-

ford City, Pa., and Cleveland plants still is pending. Current orders are for lots up to 1,000 tons, mainly foundry iron.

Prices are steady, no concessions being noted from present valley levels of \$18.50 for No. 2 foundry and basic, and \$19 for bessemer and malleable. Shipments continue active, and show increases to some points. Production by some furnaces still is failing to keep pace with shipments. Stocks are near the lowest level of the year.

Shipments of pig iron exceed production at Chicago. Southern iron is quoted nominally at \$15 to \$15.50, base, Birmingham, but it is understood orders placed in this district have figured below the minimum quotation, with silicon differentials disregarded. Northern iron sales are on the basis of \$20, Chicago furnace, for No. 2 foundry and malleable.

June shipments by Chicago district furnaces are ahead of May and promise to be the highest of any June since 1920. The seventh cargo of eastern iron has arrived by vessel, making about 20,000 tons this season. It is estimated 6,000 to 7,000 tons more is due on orders.

It is reported silvery iron prices have been reduced 50 cents to \$1.

Sales of pig iron for third quarter delivery at Birmingham are being made at \$15, base, Birmingham, a reduction of 50 cents from the price recently prevailing.

Makers are hopeful of obtaining a lower freight rate to the East during July, enabling them to meet competition along the Atlantic coast.

Production is steady, with considerable iron on furnace yards. Some furnace interests say \$15 is the lowest price at which iron has been sold in years.

The announcement caused no surprise as iron was offered by them

at that level some weeks ago north of the Ohio river.

Non-Ferrous

Tin was more active in the past week than in a long time. Prices were stronger at first but later declined. Zinc was fairly firm on account of previous buying rather than new business. Other metals showed little change.

Operations in the nonferrous metal industries are letting down seasonally, but hold well above the corresponding levels of other years.

New business in most brass and copper products is routine and for quick shipment. Some mills report slight improvement. Old orders for current shipment are large but no longer extend far ahead except in a few grades of tubing and fine copper wire. Prices of products are unchanged.

Copper

Domestic buying has been extremely light. Export business has been remarkably steady, around 1,000 tons each day for June shipment, mostly. Total shipments abroad this month probably will be the lightest in many months.

Zinc

Prime western prices have advanced to a minimum of 6.70c, East St. Louis, while several smelters continue to hold for 6.80c, at which figure they occasionally report some sales. New business has been light, but shipments are of good size.

Tin

Users and dealers have bought large quantities lately, mostly for arrivals two to four months ahead. In this action they were encouraged by the news from London indicating that tin producers are to organize. The statistical position of tin is not expected to change much this month.

Lead

Buying has been active for prompt and August shipment.

IMPORTANT ANNOUNCEMENT

to MANUFACTURERS of

SHEET METAL PRODUCTS

A genuine opportunity is offered to a limited number of responsible firms engaged in the Sheet Metal Industry to extend their present activities and enter the Neon Sign business.

N EON TUBE SIGNS are today the most popular form of electric advertising displays, rapidly replacing old time bulb signs and they are in strong demand by progressive firms everywhere. The Neon Sign business is absolutely dependent upon Sheet Metal Manufacturers, as they supply the boxes into which all Neon Signs must be built.

With the manufacturing facilities you already have, coupled with the fact that these two industries are so closely allied, there is little additional equipment required to put you in the Neon Sign business. Get into this fast growing industry at once, and start supplying the demand for Neon Signs in your territory. We supply members of our staff to supervise the installation of the necessary Neon equipment in your plant and you can be in active production in 30 days.

O UR ORGANIZATION, the American Neon Light Corporation, is one of the largest in the country, manufacturing Neon Tubing and Equipment. You are in a position to successfully do the proportionate volume of Neon business of your locality in precisely the same fashion that we do in the great New York metropolitan area. Franchises to manufacture Neon Signs under our patents (issued and pending) on a royalty basis are now being granted in all parts of the World. Our entire staff is always at the service of our licensees and our co-operation includes assistance in financing contracts for Neon Signs that are rented or sold on a deferred payment basis.

The patents owned and controlled by the American Neon Light Corporation, cover the complete manufacture of Neon Tubing and accessories and also the exclusive right to manufacture a new type Standard Neon Sign which has created nation-wide interest.

Write at once for complete information.



AMERICAN NEON LIGHT CORP.

OTTO B. SHULHOF, *President*

559 WEST 132nd STREET

- - -

NEW YORK

Chicago Warehouse Metal and Furnace Supply Prices

AMERICAN ARTISAN is the only publication containing Western Metal, Furnace Supply and Hardware prices corrected weekly

METALS

PIG IRON

Chicago Fdy.,	
No. 2	\$20 00
Southern Fdy. No. 2	21 51
Lake Superior Charcoal	27 04
Malleable	20 00

FIRST QUALITY BRIGHT CHARCOAL TIN PLATES

IC	20x28 112 sheets	\$32 50
IX	20x28	35 50
IXX	20x28 56 sheets	14 50
IXXX	20x28	15 50
IXXXX	20x28	17 00

TERNE PLATES

IC	20x28, 40-lb. 112 sheets	\$26 70
IX	20x28, 40-lb. 112 sheets	29 70
IC	20x28, 25-lb. 112 sheets	22 20
IX	20x28, 25-lb. 112 sheets	25 20
IC	20x28, 20-lb. 112 sheets	20 25
IV	20x28, 20-lb. 112 sheets	23 00

"ARMCO" INGOT IRON PLATES	
No. 8 ga.—100 lbs.	\$4 15
3/16 in.—100 lbs.	4 05
1/4 in.—100 lbs.	3 85

COKE PLATES

Cokes, 80 lbs., base, 20x28	\$12 00
Cokes, 90 lbs., base, 20x28	12 20
Cokes, 100 lbs., base, 20x28	12 40
Cokes, 107 lbs., base, IC	
20x28	12 75
Cokes, 135 lbs., base, I.C.	
20x28	14 75
Cokes, 155 lbs., base, 2X.	8 50
56 sheets	
Cokes, 175 lbs., base 3X.	9 35
56 sheets	
Cokes, 195 lbs., base 4X.	10 35
56 sheets	

BLUE ANNEALED SHEETS	
Base 10 ga.—per 100 lbs.	\$3 35
"Armco" 10 ga.—per 100 lbs.	4 15

ONE PASS COLD ROLLED BLACK

No. 18-20	per 100 lbs.	\$3 85
No. 22	per 100 lbs.	4 00
No. 24	per 100 lbs.	4 05
No. 26	per 100 lbs.	4 15
No. 27	per 100 lbs.	4 20
No. 28	per 100 lbs.	4 30
No. 29	per 100 lbs.	4 45
No. 30	per 100 lbs.	4 55

"ARMCO" GALVANIZED

"Armco" 24	per 100 lbs.	\$6 15
------------	--------------	--------

GALVANIZED

No. 16	per 100 lbs.	\$4 40
No. 18	per 100 lbs.	4 55
No. 20	per 100 lbs.	4 70
No. 22	per 100 lbs.	4 75
No. 24	per 100 lbs.	4 90
No. 26	per 100 lbs.	5 15
No. 27	per 100 lbs.	5 25
No. 28	per 100 lbs.	5 40
No. 30	per 100 lbs.	5 50

BAR SOLDER

Warranted 50-50 per 100 lbs.	\$31 25
45-55	per 100 lbs. 30 50
45-55	per 100 lbs. 29 25
Plumbers'	per 100 lbs. 27 25

ZINC

In Slabs	\$ 7 35
----------	---------

SHEET ZINC

Cask Lots (600 lbs.)	\$11 75
Sheet Lots	12 75

BRASS

Sheets, Chicago base	24 1/2 c
Mill base	23 1/2 c
Tubing, brazed, Chicago base	31 1/2 c
Mill base	30 1/2 c
Tubing, seamless, Chicago base	29 1/2 c
Mill base	28 1/2 c
Wire, Chicago base	24 1/2 c
Mill base	23 1/2 c
Rods, Chicago base	22 1/2 c
Mill base	21 1/2 c

COPPER

Sheets, Chicago base	27 1/2 c
Mill base	26 1/2 c
Tubing, seamless, Chicago base	30 1/2 c
Mill base	29 1/2 c
Wire, plain rd., 8 B. & S. Ga.	
and heavier	25 1/2 c

LEAD

American Pig	\$7 85
Bar	8 85

TIN

Bar Tin	per 100 lbs. \$50 00
Pig Tin	per 100 lbs. 49 00

HARDWARE, SHEET METAL SUPPLIES, WARM AIR FURNACE FITTINGS AND ACCESSORIES.

ASBESTOS

Paper up to 1/16	6c per lb.
Roll board	7 1/2 c per lb.
Mill board 3/32 to 1/2	7 1/2 c per lb.
Corrugated Paper (250 sq. ft. to roll)	\$6 00 per roll

BRUSHES

Furnace Pipe Cleaning Bristle with handle each	\$0 75
Flue Cleaning Steel only, each	1 25

CEMENT, FURNACE

American Seal, 5-lb. cans, net	\$ 45
American Seal, 10-lb. cans, net	55
American Seal, 25-lb. cans, net	2 25
Pecora	per 100 lbs. 7 50

CHIMNEY TOPS

Adams' Revolving		Price Doz.
4 in.	21 lbs.	\$11 00
6 in.	24 lbs.	11 50
7 in.	30 lbs.	13 50
8 in.	33 lbs.	15 00
9 in.	51 lbs.	16 50
10 in.	55 lbs.	18 00
12 in.	66 lbs.	22 00
14 in.	110 lbs.	36 00

CLINKER TONGS

Each	\$1 50
------	--------

CLIPS

Damper	
No-Rivet Steel, with tall pieces, per gross	\$9 50
Rivet Steel, with tall pieces, per gross	7 50
Tall pieces, per gross	2 40

COPPERS—Soldering

Pointed Roofing	
3 lb. and heavier	per lb. 40c
2 1/2 lb.	per lb. 45c
2 lb.	per lb. 45c
1 1/2 lb.	per lb. 55c
1 lb.	per lb. 60c

CORNICK BRAKES

Chicago Steel Bending	
No. 1 to 6B.	Net

CUT-OFFS

Gal. plain, round or cor. rd.	
26 gauge	30%
28 gauge	35%

DAMPERS

Yankee Hot Air	
7 inch, doz.	\$1 50
8 inch, doz.	2 20
9 inch, doz.	2 60
10 inch, doz.	2 80
12 inch, doz.	3 50
14 inch, doz.	5 00

ADAMS No. 1 CHECK

Check and Collar Complete	
8 inch, each	2 00
9 inch, each	2 25
End Check Only	
8 inch, each	1 50
9 inch, each	1 55
Collar Only	
8 inch, each	50
9 inch, each	55

No. 2 CHECK

8 inch, each	1 00
9 inch, each	1 00
10% Disc. on Adams No. 1 and No. 2 Check	
Diamond Smoke Pipe	
7 inch, doz.	\$2 00
8 inch, doz.	3 20
9 inch, doz.	4 80
10 inch, doz.	6 00

Adams' Sheet Metal

7 inch, doz.	\$1 60
8 inch, doz.	2 20
9 inch, doz.	2 60
10 inch, doz.	2 80
12 inch, doz.	3 50
14 inch, doz.	5 00

EAVES TROUGH

Galv. Crimpedge, crated..	75-10%
Zinc, "Barnes"	60%

ELBOWS

Conductor Pipe	
Galv. plain or corrugated, round flat Crimp,	
28 Gauge	60%
26 Gauge	45%
24 Gauge	15%
Galv. Terne Steel	
Plain Rd. and Rd. Corr.:	
28 Ga.	60%
26 Ga.	45%
24 Ga.	15%

Square Corrugated	
No. 28 Gauge	50%
26 Gauge	35%

Portico Elbows	
Standard Gauge Conductor Pipe, plain or corrugated.	
Not nested	70 & 5%
Nested Solid	70 & 5%

Sq. Corr., A. & B. & Octagon	
28 Ga.	50%
26 Ga.	35%

Portico	
1", 1 1/4", 1 1/2"	45%

Copper	
16 oz., all designs	40%

Zinc—	
All styles	60%

ELBOWS—Stove Pipe

1-piece Corrugated, Uniform Blue "Milcor" No. 28 Gauge.	Doz.
5-inch	\$1 15
6-inch	1 25
7-inch	1 75
Special Corrugated	
6-inch	\$1 00
7-inch	1 60

Adjustable—Uniform Blue

"Milcor" No. 28 Gauge. Uniform Blue.	
5-inch	\$1 50
6-inch	1 75
7-inch	2 10
WOOD FACES—60% off list.	

FENCE

726-6-13 1/2 (100 rods)	\$28 63
1945-6-14 1/2 (100 rods)	43 63

FILES AND RASPS

Heller's (American)	50-10%
American	60-10%
Arcade	50%
Black Diamond	50%
Eagle	50%
Great Western	50%
Kearney & Foot	50%
McClellan	50%
Nicholson	50%
Simonds	60%

FIRE POTS

Geo. W. Diener Mfg. Co.	
No. 02 Gasoline Torch, 1 qt.	\$ 5 15
No. 9250, Kerosene, or Gasoline Torch, 1 qt.	6 80
No. 10 Tinner's Furn. Square tank, 1 gal.	11 30
No. 15 Tinner's Furn. Round tank, 1 gal.	10 70
No. 21 Gas Soldering Furnace	8 60
No. 110 Automatic Gas Soldering Furnace	10 50

GALVANIZED WARE

Pails (Galv. after made), 10-qt.	\$3 00
Tubs (Galv. after made), No. 1	5 75
No. 2	6 50

GLASS

Single Strength, A, all brackets	85%
Single Strength, B, all brackets	87%
Double Strength, A, all brackets	85%
Double Strength, B, all brackets	87%

HANGERS

Conductor Pipe	
Milcor Perfection Wire	24%
Milcor Triplex Wire	10%
Eaves Trough	
Milcor Steel (galv. after forming) from List	50%
Milcor Selflock E. T. Wire, List	10%

HOOKS

Conductor	
"Direct Drive" Wrought Iron for wood or brick	15%

HUMIDIFIER

"Front-Rank," Automatic	
In single lots	50%
In lots of 10 or more	50-55%
In lots of 25 or more	50-10%
Vapor pans, etc., each	50%

LIFTERS

Stove Cover	
Coppered	per gro. \$6 00
Alaska	per gro. 4 75

MALLETS

Tinners	
Hickory	per doz. \$3 35

MITRES

Galvanized steel mitres	
28 Ga.	75
26 Ga.	60-35

NAILS

Cut Steel, base	
	\$4 00
Wire	
Common	\$3 35
Cement Coated	3 15

(Continued on page 220)

TONCAN

RUST-RESISTING TONCAN

can increase your business volume

FOR sheet metal work of all kinds there is no material you can use to as great advantage as Toncan Copper Mo-lyb-den-um Iron.

This scientific alloy of pure iron, copper and molybdenum fights rust and corrosion far more effectively than any other ferrous metal known. Toncan, impervious to weather conditions, fire and lightning—continues throughout the years—giving faithful service, building up satisfied customers.

You have many uses for Toncan

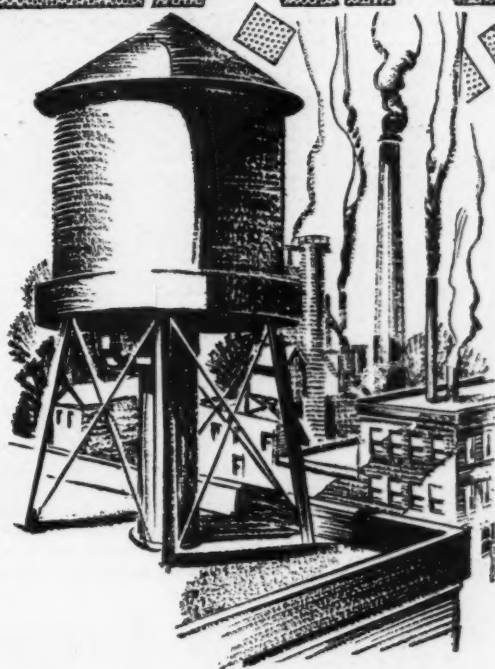
—and there are literally hundreds of others. Culverts, drains, roofing, canopies, gutters, spouts, metal lath—wherever protection from moisture of any sort or degree is necessary.

You will want to know more about Toncan and its countless advantages. Write for our free explanatory booklet.

CENTRAL ALLOY STEEL CORP.

Massillon and Canton, Ohio

World's Largest and Most Highly Specialized Alloy Steel Producers



ADVERTISERS' INDEX

The dash (—) indicates that the advertisement runs on a regular schedule but does not appear in this issue.

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Barnes Metal Prod. Co.	—	Maplewood Machinery Co.	—
Beh & Co.	—	Marshall Furnace Co.	—
Berger Bros. Co.	223	Marshalltown Mfg. Co.	—
Bertsch & Co.	223	May-Felbeger Co.	—
Brillion Furnace Co.	—	McIlvaine Burner Corp.	194
Burgess Soldering Furnace Co.	—	Meyer & Bros., F.	197
		Meyer Furnace Co.	—
C		N	
Central Alloy Steel Corp.	219	Midland Furnace Co.	191
Chicago Furnace Supply Co.	194	Miller & Doing, Inc.	—
Cleveland Castings Pattern Co.	194	Milwaukee Corr. Co., Back Cover	—
Connors Paint Co., Wm.	194	Mt. Vernon Furn. & Mfg. Co.	—
D		O	
Dieckmann Co., Ferdinand.	—	National Super Service Co.	—
Diener Mfg. Co., Geo. W.	223	New Jersey Zinc Sales Co., The	—
Dreis & Krump Mfg. Co.	223	Northern Oil Burner Co.	—
		Nortman-Duffke Co.	—
E		P	
Eller Mfg. Co.	—	Parker, Kalon Corp.	—
Emrich, C., Co.	—	Peck, H. E.	226
		Peck, Stow & Wilcox.	—
F		Q	
Fanner Mfg. Co.	—	Preferred Oil Burners, Inc.	—
Farris Furnace Co.	—	Premier Warm Air Heater Co.	—
Folsom Metal Products Co.	—		
Forest City-Walworth Run Fdy. Co.	—		
Fort Shelby Hotel.	—		
Fox Furnace Co.	192		
G		R	
Geroch Bros. Mfg. Co.	—	Richardson & Boynton Co.	—
Gothal Co., Alfred C.	—	Robinson Co., A. H.	193
Gottschalk Heating Co.	—	Rybolt Heater Co.	—
Gray Brothers Co.	—	Ryerson & Sons, Inc., Jos. T.	223
H		S	
Hall-Neal Furnace Co.	—	Sail Mountain Co.	—
Harrington & King Perf. Co.	223	Sheer Co., H. M.	226
Hart & Cooley Co.	—	Sheet Metal Trade Extension Committee	—
Henry Furnace & Foundry Co.	—	Standard Fdry. Furn. Co.	—
Hess-Snyder Company, The.	—	Standard Ventilator Co.	223
Wm. Highton & Sons Div.	—	St. Louis Tech. Inst.	—
Homer Furnace Co.	—	Success Heater Mfg. Co.	—
Howes Co., S. M.	—		
Hyro Mfg. Co.	—		
I		T	
Independent Reg. & Mfg. Co.	—	Taylor Co., N. & G.	—
Inland Steel Co.	227	Technical Products Co.	—
Interstate Machinery Co.	—	The Thatcher Co.	—
		Tuttle & Bailey Mfg. Co.	—
K		V	
Kernchen Co.	226	XXth Century Htg. & Mfg. Co.	—
Kester Solder Co.	223		
Kirk-Latty Co.	194		
		W	
		Warm Air Furnace Fan Co.	—
		Waterman-Waterbury Co.	—
		Western Steel Products Co.	—
		Williamson Heater Co.	—
		Wise Furnace Co.	—
		Wodack Electric Tool Corp.	—

Markets--Continued from Page 218

PASTE		RIDGE ROLL	
Asbestos Dry Paste:		Galv., Plain Ridge Roll, b'd'd	75-15 59
200-lb. barrel	\$14 00	Galv., Plain Ridge Roll crated	75-15
100-lb. barrel	7 50		
50-lb. pail	4 35		
10-lb. bag	1 00		
5-lb. bag	55		
2½-lb. cartons	25		
POKERS, FURNACE		SCREWS	
Each	\$0 75	Sheet Metal	
POKERS, STOVE		7, ½x¼, per gross	\$0 53
Nickel Plated, coil handles, per doz.	1 10	No. 10, ¾x3/16, per gross	53
W'r't Steel, str't or bent, per doz.	\$0 75	No. 14, ¾x¼, per gross	53
PIPE		SHEARS, TINNERS' & MACHINISTS'	
Conductor		Viking	\$22 00
Cor. Rd., Plain Rd., or Sq.		Lennox Throatless	
Galvanized		No. 18	35%
Crated and nested (all gauges)	75-7½%	Shear blades	10%
Crated and not nested (all gauges)	75-2½%	(f. a. b. Marshalltown, Iowa)	
Furnace Pipe		SHIELDS, ADJUSTABLE RADIATOR	
Double Wall Pipe and Fittings	50 & 10%	No. 1 "Gem" 11" to 17"	30%
Single Wall Pipe, Round		No. 2 "Gem" 14" to 24"	30%
Galvanized Pipe	50 & 10%	No. 8 "Gem" 35" to 65"	30%
Galvanized and Tin Fittings	50 & 10%		
Lead		SHOES	
Per 100 lbs.	\$12 50	Galv. 28 Gauge, Plain or corrugated round flat crimp	60%
Stove Pipe		28 gauge round flat crimp	45%
"Milcor" "Titelock" Uniform Blue Stove		24 gauge round flat crimp	15%
28 gauge, 5 inch U. C.	11 00		
28 gauge, 6 inch U. C.	12 00		
28 gauge, 7 inch U. C.	14 00		
30 gauge, 5 inch U. C.	10 25		
30 gauge, 6 inch U. C.	11 00		
30 gauge, 7 inch U. C.	13 00		
T-Joint Made up		SNIPS, TINNERS	
6 inch, 27 ga., per doz.	\$ 40	Clover Leaf	40 & 10%
All Zinc		National	40 & 10%
No. 11, all styles	60%	Star	50%
		Milcor	Not
PULLEYS		SQUARES	
Furnace Tackle, per doz.	\$0 85	Steel and Iron	Net
per gro.	8 50	(Add for bluing \$3 per doz. net)	
Furnace Screw (enameled)	75	Mitre	Net
		Try	Net
PUTTY		Try and Bevel	Net
Commercial Putty, 100-lb. Kits	\$3 60	Try and Mitre	Net
QUADRANTS		For's	per doz. \$5 00
Malleable Iron Damper	10%	Winterbottom's	10%
REDUCERS—Oval Stove Pipe		STOPPERS, FLUE	
Per Doz.		Common	per doz. \$1 10
7-6, 28-gauge, 1 doz. in carton	\$2 00	Gem, No. 1	per doz. 1 10
		Gem, flat, No. 3	per doz. 1 00
REGISTERS AND BORDERS		VENTILATORS	
Baseboard, Floor and Wall		Standard	30 to 40%
Cast Iron	20%		
Steel and Semi-Steel	33½%		
Baseboard, 1 piece	33½-20%		
Baseboard, 2 piece	33½%		
Wall	33½%		
Adjustable Ceiling Ventilators	33½%		
Register Faces—Cast and Steel		WIRE	
Japanned, Bronzed and Plated, 4x6 to 14x14	33½%	Black annealed wire, No. 9, per 100 lbs.	\$3 50
Large Register Faces—Cast, 14x14 to 38x42	50%	Galvanized barb wire, per 100 lbs.	3 00
Large Register Faces—Steel, 14x14 to 38x42	60%	Cattle Wire—galvanized catch weight spool, per 100 lbs.	3 50
Ventilating Register		Galvanized Plain Wire, No. 9, per 100 lbs.	3 25
Per gross	9 00		
Small, per pair	30		
Large, per pair	50		



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Meyer & Bro. Co., F., Peoria, Ill.
- Asbestos Paper.**
Sati-Mountain Co., Chicago, Ill.
- Asbestos Liquid.**
B. & F. Mfg. Co., Des Moines, Iowa
- Ball Joints.**
Alfred C. Goethal Co., Milwaukee, Wis.
- Benchies—Steel.**
Maplewood Machinery Co., Chicago, Ill.
- Blat Gates.**
Alfred C. Goethal Co., Milwaukee, Wis.
- Blow Pipe Fittings.**
Alfred C. Goethal Co., Milwaukee, Wis.
- Bolts—Stove.**
The Kirk-Latty Co., Cleveland, Ohio
Lamson & Sessions Co., Cleveland, Ohio
Ryerson & Son, Inc., Jos. T., Chgo., N. Y., St. L., Det., Cleve.
- Brakes—Bending.**
Dreis & Krump Mfg. Co., Chicago, Ill.
Ryerson & Son, Inc., Jos. T., Chgo., N. Y., St. L., Det., Cleve.
- Brakes—Cornice.**
Dreis & Krump Mfg. Co., Chicago, Ill.
- Brass and Copper.**
American Brass Co., Waterbury, Conn.
Copper & Brass Research Association, New York
- Cans—Garbage.**
Osborn Co., The J. M. & L. A., Cleveland, Ohio
- Castings—Malleable.**
Fanner Mfg. Co., Cleveland, Ohio
- Ceilings—Metal.**
Eller Manufacturing Co., Canton, Ohio
Milwaukee Corrugating Co., Mil., Ch'go, La Crosse, Kan. City
- Chaplets.**
Fanner Mfg. Co., Cleveland, Ohio
- Chimney Tops.**
Standard Ventilator Co., Lewisburg, Pa.
- Cleaners—Vacuum.**
Brillion Furnace Co., Brillion, Wis.
Gottschalk Heating Co., Covington, Ky.
National Super Service Co., Toledo, Ohio
Williamson Heater Co., Cincinnati, Ohio
- Copper.**
American Brass Co., Waterbury, Conn.
- Cornices.**
Eller Manufacturing Co., Canton, Ohio
Milwaukee Corrugating Co., Mil., Ch'go, La Crosse, Kan. City
- Cut-offs—Rain Water.**
Eller Mfg. Co., Canton, Ohio
Milwaukee Corrugating Co., Mil., Ch'go, La Crosse, Kan. City
- Dampers—Quadrants—Accessories.**
Eller Mfg. Co., Canton, Ohio
Milwaukee Corrugating Co., Mil., Ch'go, La Crosse, Kan. City
Parker-Kalon Corp., New York, N. Y.
- Damper Regulators.**
H. M. Sheer Co., Quincy, Ill.
- Dies—Punch & Press.**
La Salle Machine Works, Chicago, Ill.
- Diffuser—Air Duct.**
Aeolus-Dickinson Co., Chicago, Ill.
- Doors—Metal.**
Lupton's Sons Co., David, Philadelphia, Pa.
- Draft Regulators.**
Gray Brothers Co., Plano, Ill.
- Drive Screws—Hardened Metallic.**
Parker-Kalon Corp., 200 Varick St., New York
- Eaves Trough.**
Barnes Metal Products Co., Chicago, Ill.
Berger Bros. Co., Philadelphia, Pa.
Eller Mfg. Co., Canton, Ohio
Lupton's Sons Co., David, Philadelphia, Pa.
Milwaukee Corrugating Co., Mil., Ch'go, La Crosse, Kan. City
New Jersey Zinc Sales Co., The, New York, N. Y.
- Elbows and Shoes—Conductor.**
Barnes Metal Products Co., Chicago, Ill.
Dieckmann Co., Ferdinand, Cincinnati, Ohio
Eller Mfg. Co., Canton, Ohio
Lupton's Sons Co., David, Philadelphia, Pa.
Milwaukee Corrugating Co., Mil., Ch'go, La Crosse, Kan. City
- Wood Faces—Warm Air.**
Auer Register Co., Cleveland, Ohio
American Wood Register Co., Plymouth, Ind.
Eller Mfg. Co., Canton, Ohio
Milwaukee Corrugating Co., Mil., Ch'go, La Crosse, Kan. City
- Fittings—Conductor.**
Barnes Metal Products Co., Chicago, Ill.
Eller Mfg. Co., Canton, Ohio
Milwaukee Corrugating Co., Mil., Ch'go, La Crosse, Kan. City
- Flanges.**
Chicago Metal Mfg. Co., Chicago, Ill.
- Fittings—Steel Pipe.**
Chicago Metal Mfg. Co., Chicago, Ill.
- Flue Thimbles.**
Milwaukee Corrugating Co., Mil., Ch'go, La Crosse, Kan. City
- Furnace Cement—Asbestos.**
Connors Paint Mfg. Co., Wm., Troy, N. Y.
Eller Mfg. Co., Canton, Ohio
Milwaukee Corrugating Co., Mil., Ch'go, La Crosse, Kan. City
- Furnace Cement—Liquid.**
Technical Products Co., Pittsburgh, Pa.
- Furnace Cleaners—Suction.**
Brillion Furnace Co., Brillion, Wis.
Gottschalk Heating Co., Covington, Ky.
National Super Service Co., Toledo, Ohio
Williamson Heater Co., Cincinnati, Ohio
- Furnace Fans.**
A-C Mfg. Co., Pontiac, Ill.
A. H. Robinson Co., Massillon, Ohio
Warm Air Furnace Fan Co., The, Cleveland, Ohio
Williamson Heater Co., Cincinnati, Ohio
- Furnace Regulators.**
H. M. Sheer Co., Quincy, Ill.
- Furnace Rings.**
Eller Mfg. Co., Canton, Ohio
Forest City-Walworth Run Foundries Co., Cleveland, Ohio
Milwaukee Corrugating Co., Milwaukee, Wis.
- Furnaces—Warm Air.**
Agricola Furnace Co., Gadsden, Ala.
American Furnace Co., St. Louis, Mo.
Brillion Furnace Co., Brillion, Wis.
Emrich Co., C., Columbus, Ohio
Farris Furnace Co., Springfield, Ill.
Forest City-Walworth Run Fdy., Cleveland, Ohio
Fox Furnace Co., Elyria, Ohio
Hall-Neal Furnace Co., Indianapolis, Ind.
Henry Furnace & Fdy. Co., Cleveland, Ohio
Hess-Snyder Co., Massillon, Ohio
Homer Furnace Co., Coldwater, Mich.
Lennox Furnace Co., Marshalltown, Ia.; Syracuse, N. Y.
Magirl Foundry & Furnace Co., P. H., Bloomington, Ill.
May Fieberger Furnace Co., Newark, Ohio
Marshall Furnace Co., Marshall, Mich.
Meyer Furnace Co., The, Peoria, Ill.
Midland Furnace Co., Columbus, Ohio
Mt. Vernon Furnace & Mfg. Co., Mt. Vernon, Ill.
Premier Warm Air Heater Co., Dowagiac, Mich.
Richardson & Boynton Co., New York, N. Y.
Robinson Co., A. H., Massillon, Ohio
Success Heater Mfg. Co., Des Moines, Ia.
XXth Century Heating & Ventilating Co., Akron, Ohio
Waterman-Waterbury Co., Minneapolis, Minn.
Western Steel Products Co., Duluth, Minn.
Williamson Heater Co., Cincinnati, Ohio
Wise Furnace Co., Akron, Ohio
- Glass—Wire.**
Lupton's Sons Co., David, Philadelphia, Pa.
- Grilles.**
Auer Register Co., Cleveland, Ohio
Harrington & King Perforating Co., Chicago, Ill.
Hart & Cooley Co., New Britain, Conn.
Independent Register & Mfg. Co., Cleveland, Ohio
Tuttle & Bailey Mfg. Co., Chicago, Ill.
- Grilles—Stove Front.**
Tuttle & Bailey Mfg. Co., Chicago, Ill.
- Guards—Machine and Belt.**
Harrington & King Perforating Co., Chicago, Ill.
Nortmann-Duffke Co., Milwaukee, Wis.
- Handles—Boiler.**
Berger Bros. Co., Philadelphia, Pa.
- Handles—Soldering Iron.**
Hyro Mfg. Co., New York, N. Y.
- Hangers—Eaves Trough.**
Eller Mfg. Co., Canton, Ohio
Lupton's Sons Co., David, Philadelphia, Pa.
Milwaukee Corrugating Co., Mil., Ch'go, La Crosse, Kan. City
- Heat Regulation Systems.**
H. M. Sheer Co., Quincy, Ill.
- Heaters—Cabinet.**
Fox Furnace Co., Elyria, Ohio
Waterman-Waterbury Co., Minneapolis, Minn.
- Heaters—Combination Hot Water.**
Alamo Heater Co., Chicago, Ill.
- Heaters—Domestic Hot Water.**
Alamo Heater Co., Chicago, Ill.
- Heaters—School Room.**
Meyer Furnace Co., The, Peoria, Ill.
- Hotels.**
Fort Shelby Hotel, Detroit, Mich.
- Humidifiers.**
Meyer & Bro. Co., F., Peoria, Ill.
- Lath—Expanding Metal.**
Eller Mfg. Co., Canton, Ohio
Milwaukee Corrugating Co., Mil., Ch'go, La Crosse, Kan. City
- Machines—Crimping.**
Bertsch & Co., Cambridge City, Ind.
- Machinery—Culvert.**
Bertsch & Co., Cambridge City, Ind.
- Machines—Tinmith's.**
Bertsch & Co., Cambridge City, Ind.
- Dreis & Krump Mfg. Co., Chicago, Ill.**
- Interstate Machinery Co., Chicago, Ill.**
- La Salle Machine Works, Chicago, Ill.**
- Maplewood Machinery Co., Chicago, Ill.**
- Marshalltown Mfg. Co., Marshalltown, Iowa**
- Osborn Co., The J. M. & L. A., Cleveland, Ohio**
- Peck, Stow & Wilcox Co., Southington, Conn.**
- Ryerson & Son, Inc., Jos. T., Chgo., N. Y., St. L., Det., Cleve.**
- Hyro Mfg. Co., New York, N. Y.**
- Metals—Perforated.**
Harrington & King Perforating Co., Chicago, Ill.
Nortmann-Duffke Co., Milwaukee, Wis.
- Miters.**
Eller Mfg. Co., Canton, Ohio
Friedley-Voshardt Co., Chicago, Ill.
Milwaukee Corrugating Co., Mil., Ch'go, La Crosse, Kan. City
- Miters—Eaves Trough.**
Barnes Metal Products Co., Chicago, Ill.
Eller Mfg. Co., Canton, Ohio
Lupton's Sons Co., David, Philadelphia, Pa.
Milwaukee Corrugating Co., Mil., Ch'go, La Crosse, Kan. City
- Nails—Hardened Masonry.**
Parker-Kalon Corp., New York, N. Y.
- Oil Burners.**
McIlvaine Burner Corp., Evanston, Ill.
Northern Oil Burner Co., Minneapolis, Minn.
Preferred Oil Burners, Inc., Peoria, Ill.
- Ornaments—Sheet Metal.**
Eller Mfg. Co., Canton, Ohio
Friedley-Voshardt Co., Chicago, Ill.
Gerock Bros. Mfg. Co., St. Louis, Mo.
Miller & Deing, Inc., Brooklyn, N. Y.
Milwaukee Corrugating Co., Mil., Ch'go, La Crosse, Kan. City
- Paint.**
Connors Paint Mfg. Co., Wm., Troy, N. Y.
- Patterns—Furnace and Stove.**
Cleveland Castings Pattern Co., Cleveland, Ohio
Quincy Pattern Co., Quincy, Ill.
Vedder Pattern Works, Troy, N. Y.

(Continued on page 224)

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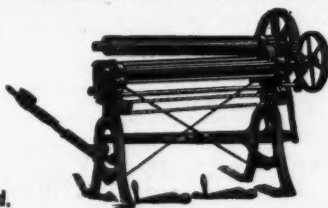
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BUYERS' DIRECTORY

(Continued from page 222)

Perforated Metals.

Harrington & King Perforating Co., Chicago, Ill.
 Nortmann-Duffke Co., Milwaukee, Wis.

Pipe and Fittings—Furnace.

Chicago Furnace Supply Co., Chicago, Ill.
 Eller Mfg. Co., Canton, Ohio
 Henry Furnace & Fdy. Co., Cleveland, Ohio
 Lamneck Co., W. E., Columbus, Ohio
 Meyer & Bro. Co., F., Peoria, Ill.
 Milwaukee Corrugating Co., Mil., Ch'go, La Crosse, Kan. City
 Osborn Co., The J. M. & L. A., Cleveland, Ohio

Pipe and Fittings—Stove.

Meyer & Bro. Co., F., Peoria, Ill.
 Milwaukee Corrugating Co., Mil., Ch'go, La Crosse, Kan. City

Pipe—Conductor.

Barnes Metal Products Co., Chicago, Ill.
 Berger Bros. Co., Philadelphia, Pa.
 Dieckmann Co., Ferdinand, Pa.
 Eller Mfg. Co., Canton, Ohio
 Lupton's Sons Co., David, Philadelphia, Pa.
 Milwaukee Corrugating Co., Mil., Ch'go, La Crosse, Kan. City
 New Jersey Zinc Sales Co., The New York, N. Y.

Presses.

La Salle Machine Works, Chicago, Ill.

Pipe Covering.

Sall Mountain Co., Chicago, Ill.

Punches.

Bertsch & Co., Cambridge City, Ind.
 Interstate Machinery Co., Chicago, Ill.
 La Salle Machine Works, Chicago, Ill.
 Peck, Stow & Wilcox Co., Southington, Conn.
 Ryerson & Son, Inc., Jos. T., Chgo, N. Y., St. L., Det., Cleve.

Punches—Combination Bench and Hand.

Hyro Mfg. Co., New York, N. Y.
 Ryerson & Son, Inc., Jos. T., Chgo, N. Y., St. L., Det., Cleve.

Punches—Hand.

Hyro Mfg. Co., New York, N. Y.
 Ryerson & Son, Inc., Jos. T., Chgo, N. Y., St. L., Det., Cleve.

Putty—Stove.

Connors Paint Mfg. Co., Wm., Troy, N. Y.

Radiator Cabinets.

The Hart & Cooley Mfg. Co., New Britain, Conn.
 Tuttle & Bailey Mfg. Co., Chicago, Ill.

Radiators—Shields.

Beh & Co., Inc., New York, N. Y.

Register Shields.

Beh & Co., Inc., New York, N. Y.

Registers—Warm Air.

Auer Register Co., Cleveland, Ohio
 Eller Mfg. Co., Canton, Ohio
 Forest City-Walworth Run Foundries Co., Cleveland, Ohio
 Hart & Cooley Co., New Britain, Conn.
 Henry Furnace & Fdy. Co., Cleveland, Ohio
 Independent Register & Mfg. Co., Cleveland, Ohio
 Lamneck & Co., W. E., Columbus, Ohio
 Meyer & Bro. Co., F., Peoria, Ill.
 Milwaukee Corrugating Co., Mil., Ch'go, La Crosse, Kan. City
 Rock Island Register Co., Rock Island, Ill.
 Tuttle & Bailey Mfg. Co., Chicago, Ill.

Registers—Wood.

American Wood Register Co., Plymouth, Ind.
 Auer Register Co., Cleveland, Ohio
 Eller Mfg. Co., Canton, Ohio
 Milwaukee Corrugating Co., Mil., Ch'go, La Crosse, Kan. City

Regulators—Heat.

H. M. Sheer Co., Chicago, Ill.

Ridging.

Armco Distributors Ass'n of America, Middletown, Ohio
 Eller Mfg. Co., Canton, Ohio
 Lupton's Sons Co., David, Philadelphia, Pa.
 Milwaukee Corrugating Co., Mil., Ch'go, La Crosse, Kan. City

Rivets—Stove.

The Kirk-Latty Co., Cleveland, Ohio
 Lamson & Sessions Co., Cleveland, Ohio
 Ryerson & Son, Inc., Jos. T., Ch'go, N. Y., St. L., Det., Cleve.

Rods—Stove.

The Kirk-Latty Co., Cleveland, Ohio
 Lamson & Sessions Co., Cleveland, Ohio

Rolls—Forming.

Bertsch & Co., Cambridge City, Ind.

Roofing Cement.

Connors Paint Mfg. Co., Wm., Troy, N. Y.

Roof—Flashing.

Eller Mfg. Co., Canton, Ohio
 Milwaukee Corrugating Co., Milwaukee, Wis.

Roofing—Iron and Steel.

Armco Distributors Ass'n of America, Middletown, Ohio
 Central Alloy Steel Corp., Massillon, Ohio
 Eller Mfg. Co., Canton, Ohio
 Inland Steel Co., Chicago, Ill.
 Milwaukee Corrugating Co., Mil., Ch'go, La Crosse, Kan. City
 Osborn Co., The J. M. & L. A., Cleveland, Ohio
 Ryerson & Son, Inc., Jos. T., Chgo, N. Y., St. L., Det., Cleve.

Roofing—Tin.

Eller Mfg. Co., Canton, Ohio
 Milwaukee Corrugating Co., Mil., Ch'go, La Crosse, Kan. City
 Taylor Co., N. & G., Philadelphia, Pa.

Roofing—Zinc.

New Jersey Zinc Sales Co., The, New York, N. Y.

Rubbish Burners.

Hart & Cooley Co., New Britain, Conn.

Schools—Sheet Metal Pattern Drafting.

St. Louis Technical Institute, St. Louis, Mo.

Schools—Warm Air Heating.

St. Louis Technical Institute, St. Louis, Mo.

Screws—Hardened Metallic Drive.

Eller Mfg. Co., Canton, Ohio
 Milwaukee Corrugating Co., Mil., Ch'go, La Crosse, Kan. City
 Parker-Kalon Corp., 200 Varick St., New York

Screws—Hardened Self-Tapping Sheet Metal.

Eller Mfg. Co., Canton, Ohio
 Milwaukee Corrugating Co., Mil., Ch'go, La Crosse, Kan. City
 Parker-Kalon Corp., 200 Varick St., New York

Screens—Perforated Metal.

Harrington & King Perforating Co., Chicago, Ill.

Shears—Hand and Power.

Interstate Machinery Co., Chicago, Ill.
 Marshalltown Mfg. Co., Marshalltown, Iowa
 Peck, Stow & Wilcox Co., Southington, Conn.
 Ryerson & Son, Inc., Jos. T., Ch'go, N. Y., St. L., Det., Cleve.
 Viking Shear Co., Erie, Pa.

Sheet Metal Screws—Hardened, Self-Tapping.

Parker-Kalon Corp., 200 Varick St., New York

Sheets—Black and Galvanized.

Armco Distributors Ass'n of America, Middletown, Ohio
 Central Alloy Steel Corp., Massillon, Ohio
 Eller Mfg. Co., Canton, Ohio
 Inland Steel Co., Chicago, Ill.
 Milwaukee Corrugating Co., Mil., Ch'go, La Crosse, Kan. City
 Osborn Co., The J. M. & L. A., Cleveland, Ohio
 Ryerson & Son, Inc., Jos. T., Ch'go, N. Y., St. L., Det., Cleve.
 Taylor Co., N. & G., Philadelphia, Pa.

Sheets—Iron.

Armco Distributors Ass'n of America, Middletown, Ohio
 Central Alloy Steel Corp., Massillon, Ohio
 Eller Mfg. Co., Canton, Ohio
 Milwaukee Corrugating Co., Mil., Ch'go, La Crosse, Kan. City
 Ryerson & Son, Inc., Jos. T., Chgo, N. Y., St. L., Det., Cleve.

Sheets—Tin.

Taylor Co., N. & G., Philadelphia, Pa.

Sheets—Zinc.

New Jersey Zinc Sales Co., The, New York, N. Y.

Shingles and Tiles—Metal.

Eller Mfg. Co., Canton, Ohio
 Milwaukee Corrugating Co., Mil., Ch'go, La Crosse, Kan. City

Sifters—Ash.

Diener Mfg. Co., G. W., Chicago, Ill.

Sky Lights.

Eller Mfg. Co., Canton, Ohio
 Lupton's Sons Co., David, Philadelphia, Pa.
 Milwaukee Corrugating Co., Mil., Ch'go, La Crosse, Kan. City

Snips

Peck, Stow & Wilcox Co., Southington, Conn.
 Ryerson & Son, Inc., Jos. T., Chgo, N. Y., St. L., Det., Cleve.

Solder.

Eller Mfg. Co., Canton, Ohio
 Kester Solder Co., Chicago, Ill.
 Milwaukee Corrugating Co., Mil., Ch'go, La Crosse, Kan. City

Soldering Furnaces.

Burgess Soldering Furnace Co., Columbus, Ohio
 Diener Mfg. Co., G. W., Chicago, Ill.
 Ryerson & Son, Inc., Jos. T., Chgo, N. Y., St. L., Det., Cleve.
 Soldering Supplies, Chicago, Ill.

Specialties—Hardware.

Diener Mfg. Co., G. W., Chicago, Ill.

Stars—Hard Iron Cleaning.

Fanner Mfg. Co., Cleveland, Ohio

Statuary.

Friedley-Voshardt Co., Chicago, Ill.
 Gerock Bros. Mfg. Co., St. Louis, Mo.
 Miller & Doing, Inc., Brooklyn, N. Y.

Stove Pipe Reducers.

Eller Mfg. Co., Canton, Ohio
 Milwaukee Corrugating Co., Mil., Ch'go, La Crosse, Kan. City

Tinplate.

Eller Mfg. Co., Canton, Ohio
 Milwaukee Corrugating Co., Mil., Ch'go, La Crosse, Kan. City
 Osborn Co., The J. M. & L. A., Cleveland, Ohio
 Taylor Co., N. & G., Philadelphia, Pa.

Tools—Tinsmith's.

Bertsch & Co., Cambridge City, Ind.
 Dries & Krump Mfg. Co., Chicago, Ill.
 Hyro Mfg. Co., New York, N. Y.
 Interstate Machinery Co., Chicago, Ill.
 Maplewood Machinery Co., Chicago, Ill.
 Osborn Co., The J. M. & L. A., Cleveland, Ohio
 Peck, Stow & Wilcox Co., Southington, Conn.
 Ryerson & Son, Inc., Jos. T., Chgo, N. Y., St. L., Det., Cleve.
 Viking Shear Co., Erie, Pa.

Torches.

Burgess Soldering Furnace Co., Columbus, Ohio
 Diener Mfg. Co., G. W., Chicago, Ill.
 Ryerson & Son, Inc., Jos. T., Chgo, N. Y., St. L., Det., Cleve.

Trade Extension.

Sheet Steel Trade Extension Committee, Cleveland, Ohio

Trimings—Stove.

Fanner Mfg. Co., Cleveland, Ohio

Vacuum Cleaner—Furnace.

Brillion Furnace Co., Brillion, Wis.
 Gottschalk Heating Co., Covington, Ky.
 National Super Service Co., Toledo, Ohio
 Williamson Heater Co., Cincinnati, Ohio

Ventilators.

Aeolus Dickinson Co., Chicago, Ill.
 Arex Company, Chicago, Ill.
 Berger Bros. Co., Philadelphia, Pa.
 Eller Mfg. Co., Canton, Ohio
 Folson Metal Products Co., Chicago, Ill.
 Friedley-Voshardt Co., Chicago, Ill.
 Kernchen Co., Chicago, Ill.
 Lupton's Sons Co., David, Philadelphia, Pa.
 Milwaukee Corrugating Co., Mil., Ch'go, La Crosse, Kan. City
 Standard Ventilator Co., Lewisburg, Pa.

Ventilators—Ceiling.

Hart & Cooley Co., New Britain, Conn.
 Henry Furnace & Fdy. Co., Cleveland, Ohio

Windows—Steel.

Lupton's Sons Co., David, Philadelphia, Pa.

Zinc.

New Jersey Zinc Co., The, New York, N. Y.

Mention AMERICAN ARTISAN in your reply—Thank you!

WANTS AND SALES

Yearly subscribers to the **AMERICAN ARTISAN** may insert advertisements of not more than fifty words in our Want and Sales Columns **WITHOUT CHARGE**.

Such advertisements, however, must be limited to help or situation wanted, tools or equipment for sale, to exchange or to buy, business for sale or location desired and must reach our office by Thursday of the week of publication. This privilege is not extended to manufacturers or jobbers—or those making a business of buying and selling used machines—employment agencies and brokers.

When sending advertisement state whether your name or blind number is to be used.

BUSINESS CHANCES

Lightning Rods—Dealers who are selling Lightning Protection will make money by writing to us for our latest **Factory to Dealer Prices**. We employ no salesmen and save you all overhead charges. Our Pure Copper Cable and Fixtures are endorsed by the National Board of Fire Underwriters and hundreds of dealers. Write today for samples and prices. **L. K. Diddle Company, Marshfield, Wis.**

For Sale—Sheet metal and furnace business located in growing city of 50,000. Cement block building 50x72, located on state highway. Complete set of tools including Brake. Doing good business but must sell on account of other interests. Address **Y-502, AMERICAN ARTISAN, 139 N. Clark St., Chicago, Ill.**

For Sale—\$1,000.00 pays for machinery, tools and a nice business with a city of 15,000 population. We manufacture switch boxes, tables, letter files, wardrobe cabinets and other articles. Address **Y-501, AMERICAN ARTISAN, 139 N. Clark Street, Chicago, Ill.**

For Sale—Well located corner lot, 66x132 with brick veneer building. Nice show room with plate glass front. Plenty room left for plumbing, heating and tin shop. Will sell my plumbers and tinnerns tools. Full set of each. Address **John L. Bloyd, Bement, Ill. Phone 322. Z-501**

BUSINESS CHANCES

Growing sheet metal shop wants experienced man to invest \$3,000.00 or more. Blow pipe, furnace and general sheet metal work. Practical mechanic or estimator and business getter wanted. **Isler Sheet Steel & Pipe Works, 109 E. 12th St., Portland, Ore. K-502**

For Sale—On account of age and health. sheet metal shop in city of 152,000 population. Sale consists of store and dwelling with work shop in rear. Fully equipped. For full particulars address **L-502, AMERICAN ARTISAN, 620 S. Michigan Ave., Chicago, Ill.**

For Sale—The only sheet metal shop in town of 2,000 population. Full line of tools. Will sell at a bargain. Address **W. A. Halbleib, Marengo, Ill. X502**

SITUATION WANTED

Position wanted by young man as representative of Warm Air Furnace Manufacturer or Warm Air accessory manufacturer. Prefer Eastern territory. Well acquainted with dealers and users in Eastern Pennsylvania, New Jersey, Delaware and Maryland. Ten years' experience as sales manager for a Philadelphia Warm Air Furnace and accessory concern. Address **A-503, AMERICAN ARTISAN, 139 N. Clark St., Chicago, Ill.**

Experienced bookkeeper and office man open for position. My work has been with hardware and implement dealers and plumbing and heating concerns. Competent to take charge of office, look after the accounting and collections. Graduate of business and short hand course. Thoroughly familiar with all office detail work. If interested, address **Edwin P. Anderson, 329 N. Fifth, Keokuk, Iowa. B-502**

Situation Wanted—By an experienced business man, formerly in business. An organizer, manager, bookkeeper, traveling salesman, etc., in staple goods, specialties and new inventions. Has covered 80 per cent United States territory. Can adapt himself to any line or territory. References covering character, honesty and ability furnished. Address **Eugene Belson, Lind, Washington. B503**

Position wanted by first class tinner with good technical education on general sheet metal and furnace work. Prefer permanent position in Missouri or adjoining states. Please state wages and hours with other particulars. Address **J. D. Grace, Elmer, Mo. Z502**

Wanted—A furnace vacuum cleaner with all attachments. State lowest price, how long used and condition. Super Service Cleaner preferred. Address **F. H. Caldwell, Zion, Illinois. A-502**

HELP WANTED

Wanted—Sheet metal worker not over 40 years of age, who is looking for a good steady position, to locate in a city of 10,000. Must have experience in factory work and in general sheet metal and furnace work. I have such a position for the right party. Address **S-502, AMERICAN ARTISAN, 139 N. Clark St., Chicago, Ill.**

Wanted at Once—A first class sheet metal worker and furnace installer. Give full particulars in first letter. No boomer need apply. Year around job for a first class man. Address **Bodlak's Tin Shop, 212 6th Street, Devils Lake, North Dakota. C-502**

Wanted—A reliable productive all around sheet metal worker for country town shop. Eaves, roofing, venting, furnace and some pipe work. Protestant preferred. We pay \$30.00 per week. Steady for right party. Address **The Buehrens Tin Shop, Dorchester, Wisconsin. D-502**

Wanted—Sheet metal worker at Logansport, Indiana. Experienced in hollow metal doors preferred but not essential. Able to read plans, lay out work for manufacturing and erection. Address **M-502, AMERICAN ARTISAN, 620 S. Michigan Ave., Chicago, Ill.**

Wanted—Heating supply salesmen to handle as a side line, a humidifier and dust collector for farm air furnace. To sell on a 50-50 basis. Protected by U. S. Patent. Address **J. S. Nelson, 810 East 7th St., Sioux Falls, So. Dakota. T502**

Wanted—Tinner or soldering hand with some experience in retinning to solder, cream and milk cans. State wages expected and how soon you can come. Address **Dan S. Colvin, Moorhead, Minn. P-502**

Wanted—First class Tinner and Furnace man in Midwestern city of 12,000. A good opening for the right man. Address **R-502, AMERICAN ARTISAN, 139 N. Clark St., Chicago, Ill.**

Wanted—Combination tinner and plumber. Must be a young man. Plenty of work. Wages 75 cents per hour. Address **Fesler's Tin Shop, Huntsville, Texas. O-502**

Wanted—In southern Minnesota, town of about 3,500. A young man who can do plumbing and steam fitting. Address **R-501, AMERICAN ARTISAN, 139 N. Clark Street, Chicago, Ill.**

TINNERS' TOOLS

For Sale—One No. 2 Niagara Groover, 30 inch—one 30 inch Niagara cross lock seamer. Both machines are in first class condition. If you can use either or both, make me a cash offer. Address **S. E. Ethridge, 1103 Denison St., Little Rock, Arkansas. J-503**

Have You Read the Special Article
which appears in the center of this issue?

THIS special story and others which run regularly in **AMERICAN ARTISAN** are written not only to show you what other contractors are doing but to help you to get similar work. Show these articles to prospects and architects—show them that this is the kind of work You can do.

TINNERS' TOOLS

For Sale—Set of tinnerns tools. Some nearly new and all in good condition. Will trade for enclosed automobile, cash or what have you? Address W-502. AMERICAN ARTISAN, 139 N. Clark St., Chicago, Ill.

Wanted to Buy—(Used) Throatless shear capacity No. 12 gauge. Pan Brake, capacity No. 12 gauge four to five feet. Power Punching Press. Address Dean Specialty Works, San Antonio, Texas.

H-502

Wanted—Eight foot, 18 gauge square shear in good condition. Ohl or Niagara make. Address Johnson Sheet Metal Works, 251 Monroe Ave., Rochester, New York.

G-502

SPECIAL NOTICES

The Rate for Special Notices
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Furnace and Stove salesman, long, successful experience, over wide range of territory, extending from coast to coast; also experienced in hardware, mill and mine supply buying, sales, management and production work. Understand recirculating air system and National Standard Code of Warm Air Heating. Very high class references. Now employed, selling Buffalo trade, for well-known stove and furnace foundry. Will consider new connection, eastern or western territory, with either straight line of furnaces, ranges or combined, or any worthy line that comes within my experience and capacity. Address P. O. Box 1075, Buffalo, New York.

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BOOKS

The Standard Code Computing Rule, which is adapted from Article III of the 5th Edition of the Standard Code, is being used by warm air heating men all over the country. Here is what the Computing Rule will determine: (1) The warm air pipe and register areas for first, second and third floor rooms. (2) The areas necessary for 70° inside temperature when the outside temperatures are zero, 10, 20 and 30 degrees above or below zero. (3) The areas from the contents, glass, wall, roof and ceiling. The factors as covered in Table "A" are represented in accurate form. (4) The areas for rooms having one, one and one-half and two air changes per hour. (5) The unusual exposure requirements as the 10% for east and west and 15% for northeast, north and northwest rooms. Rule is circular, measuring 5½ inches in diameter and ¼ inch thick, being made of specially prepared celluloid. Washable and unbreakable.

Price, \$3.00, postpaid, from Book Dept., AMERICAN ARTISAN, 139 N. Clark St., Chicago, Ill.

Manual of Automotive Radiator Construction and Repair, by F. L. Curfman and T. H. Leet—Anyone interested in Radiator Repairing will find the 185 pages of practical instructions and the 120 illustrations showing actual construction and repairing a big help. In a condensed manner some four to five thousand answers to questions are given. It is thoroughly practical as both authors are men of wide experience in this work. Printed in large, easy to read type. Measures 5½x9 inches. Price \$2.50. Order from book Dept., AMERICAN ARTISAN, 139 North Clark Street, Chicago, Illinois.

The Revised Edition of the New Metal Worker Pattern Book by Kittredge and Associates is one book that should be in every shop. As a reference book alone it is indispensable. Over 500 9x11-inch pages with 895 illustrations. It covers the principles underlying practically every problem that is likely to come up in daily practice. Beginning with the selection and use of drawing tools, the author explains linear and geometrical drawing so clearly that one who has had no previous knowledge of arithmetic or drawing may understand these essentials and apply them. The most approved methods of pattern cutting are also given in the course of the work. Price, \$6.00, postpaid. Order from the Book Dept., AMERICAN ARTISAN, 139 N. Clark St., Chicago, Ill.

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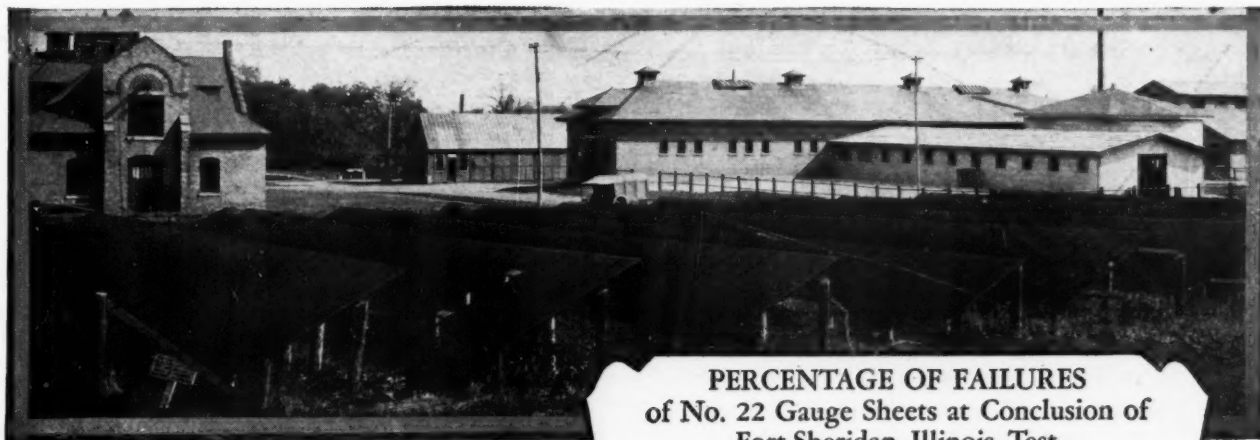


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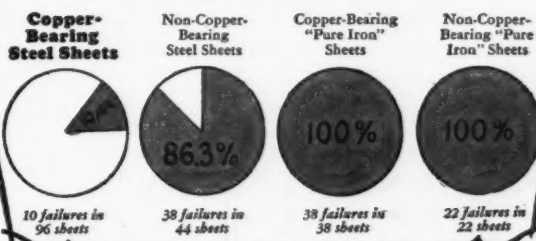
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STEEL SHEETS ON TEST RACKS AT FORT SHERIDAN, ILL.

For more than 11 years rain, snow, sun and dew conspired to destroy the steel sheets exposed under the auspices of the American Society for Testing Materials at this large testing ground. The result of this test supplied us with the FACTS of longer life and greater service which we are constantly passing on to you.

PERCENTAGE OF FAILURES
of No. 22 Gauge Sheets at Conclusion of
Fort Sheridan, Illinois, Test



INLAND *Copper Alloy* STEEL SHEETS

The chart above tells only part of the story. The user should know that if the test had ended six months earlier, it would have left all of the copper bearing steel sheets intact, as the first failure appeared only at the final inspection. The user should know also that the first failure took place in the non-copper-bearing steel sheets at 32 months, in non-copper-bearing "pure iron" at 48, in copper bearing "pure iron" at 101—and not until 132 months in the copper bearing steel sheets.

A study of the official report on this test shows that copper bearing steel sheets were superior in resisting corrosion and that they lasted three to five times as long as other sheets.

The whole story of INLAND *Copper Alloy* STEEL SHEETS is presented in complete and interesting fashion in our booklet. Ask for it.

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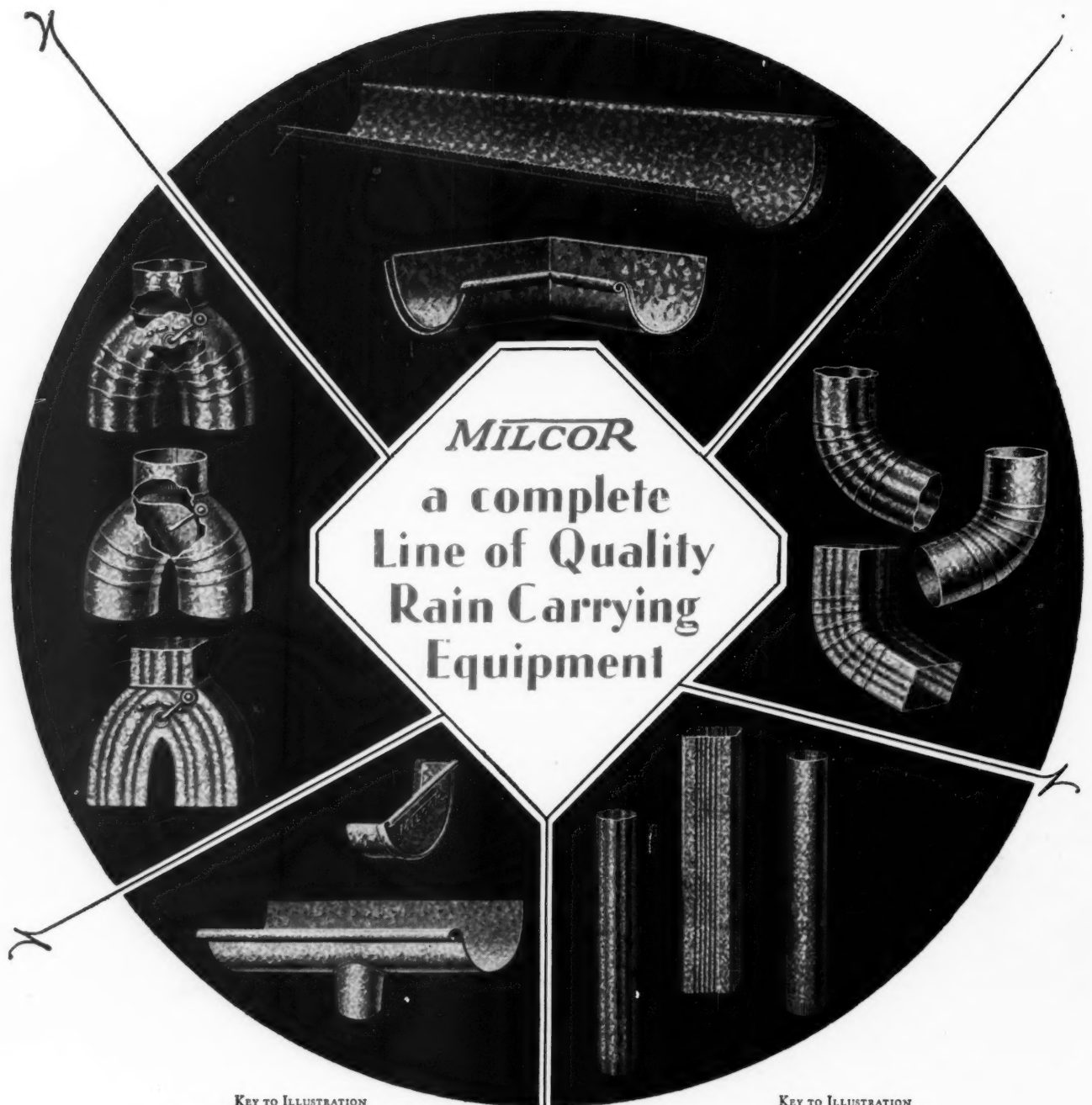
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SHEETS BARS PLATES SHAPES RAILS TRACK ACCESSORIES RIVETS BILLETS



KEY TO ILLUSTRATION
 Top: Milcor "Crimpedge" Gutter — Slip Joint
 Upper Left: Kuehn's Korrekt Kut-Offs
 Lower Left: Milcor End and Drops

KEY TO ILLUSTRATION
 Top: Milcor One-Piece Mitre — Inside
 Upper Right: Milcor Conductor Pipe Elbows
 Lower Right: Milcor "Interlock" Conductor Pipe

In Milcor you have a source of supply which covers every up-to-date development in quality rain-carrying equipment . . A line that is complete in all details . . a service that cannot be surpassed . . and a reputation that has made Milcor the standard of fine value.

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